JULY 5, 1951

IRON AGE

VOL. 168 NO. 1

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DIGEST

of the week in metalworking

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KOREA PEACE WILL NOT MEAN ENOUGH STEEL

PAGE 15

Whether or not peace finally comes in Korea, there will be no extra steel this year for civilian goods producers. Defense appropriations have already been made and will not be cut back or cancelled; CMP and other controls will stay in force and steel will still be channeled to essential goods.

ENGINE TOOL PROGRAM HIT BY DEFENSE

PAGE 70

Long anticipated showdown between civilian and defense tooling has arrived. One auto firm has had to shelve some of its tooling for high compression engines—and will be asked to compensate the machine tool builder for work performed up to the present time. Defense takes precedence.

INDUSTRY OF SOUTH IDAHO ON DISPLAY

PAGE 75

San Francisco financiers as guests of the Idaho Power Co. and other firms were shown the industrialization now under way in the southern part of Idaho. Although there has never been a power shortage in that state, new facilities will be put in if new industry moves in and demand increases.

DPA-NPA MERGER SIMPLIFIES WAR PLANNING

PAGE 77

Merger of DPA with NPA is resulting in elimination of duplicate defense planning—but not in fewer employees. Mobilizer Wilson took the stand that DPA was his planning agency while NPA was an operating agency. But Commerce's Sawyer convinced Wilson of the merger's need.

BORON STEELS—A NEW ERA IN METALLURGY

PAGE 79

The heavily alloyed steels are gone, maybe forever, except in most critical military applications. So boron steels assume major importance. This series will give latest information on boron steels — what they are, what they will do, what they won't do, and how they are being applied.

UNIQUE FIXTURES HOLD TANKS FOR WELDING

PAGE 87

Unique fixtures facilitate the arcwelding of aluminum aircraft wingtip tanks for Republic Aviation's jet fighters. Both hand and automatic Heliarc welding are used, with and without filler rod. A special spotwelding setup is also used in these complex aluminum welding operations.

AN APPROACH TO SHELL FORGING PROBLEMS

PAGE 90

Each of the several shell forging methods has certain limitations, and poses a variety of problems. But the solutions to such problems as forging symmetry, cavity and surface defects, are fairly simple when properly analyzed and sound engineering principles and practices are applied.

MACHINE TOOL FIELD ORDER HELD BACK

PAGE 101

Machine tool builders lost pricing relief from OPS after starting on to subcontracting plans, overtime, and getting more workers. Congress banned the order for July. Most companies contacted by The Iron Age were pleased with the order but some thought it was only a step in the right direction.

WASHINGTON TO MAINTAIN DEFENSE WORK

PAGE 103

A cease-fire in Korea will not solve the steel supply problem—at least not immediately. Washington will try to maintain rearmament full force. Defense spending will increase and subcontracting volume grow. Thus steel will not be easier in the near future—for the rest of '51 and early '52.

USED MACHINERY DEALERS WAIT FOR OPS

PAGE 104

Used machinery dealers are fretting impatiently on the last mile of waiting for a special pricing order from OPS. It may be on the way. Some buyers are holding off buying waiting for rollbacks and summer has wilted some markets. But good business is ahead, the entire trade feels.

STEEL NATIONALIZATION FEUD IN THE OPEN

PAGE 107

The cold war between British steelmen and the Steel Corp. which dispossessed them has flared out into the open after a period of kid glove maneuvering. The Minister of Supply has charged the steelmen with using every trick to upset nationalization and wants their purchasing agencies.

ANNEALING FURNACE FITS LOW HEADROOM

NEXT WEEK

When an already-existing plant facility was bought for an expansion program, its low headroom required design of a special wire annealing furnace. Its pan-pull transfer car loading system eliminates overhead handling. For the handling of coils and loading of pans, fork trucks are used.

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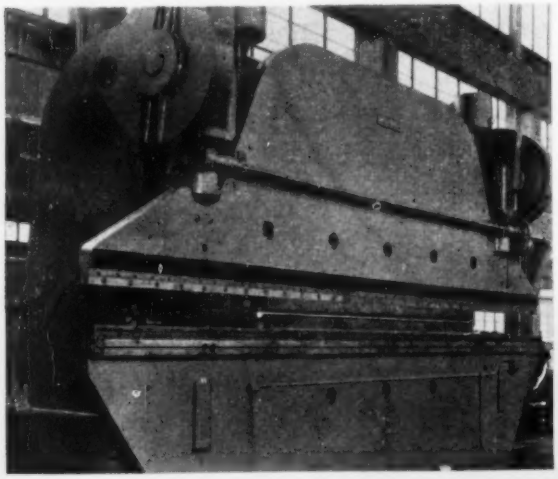
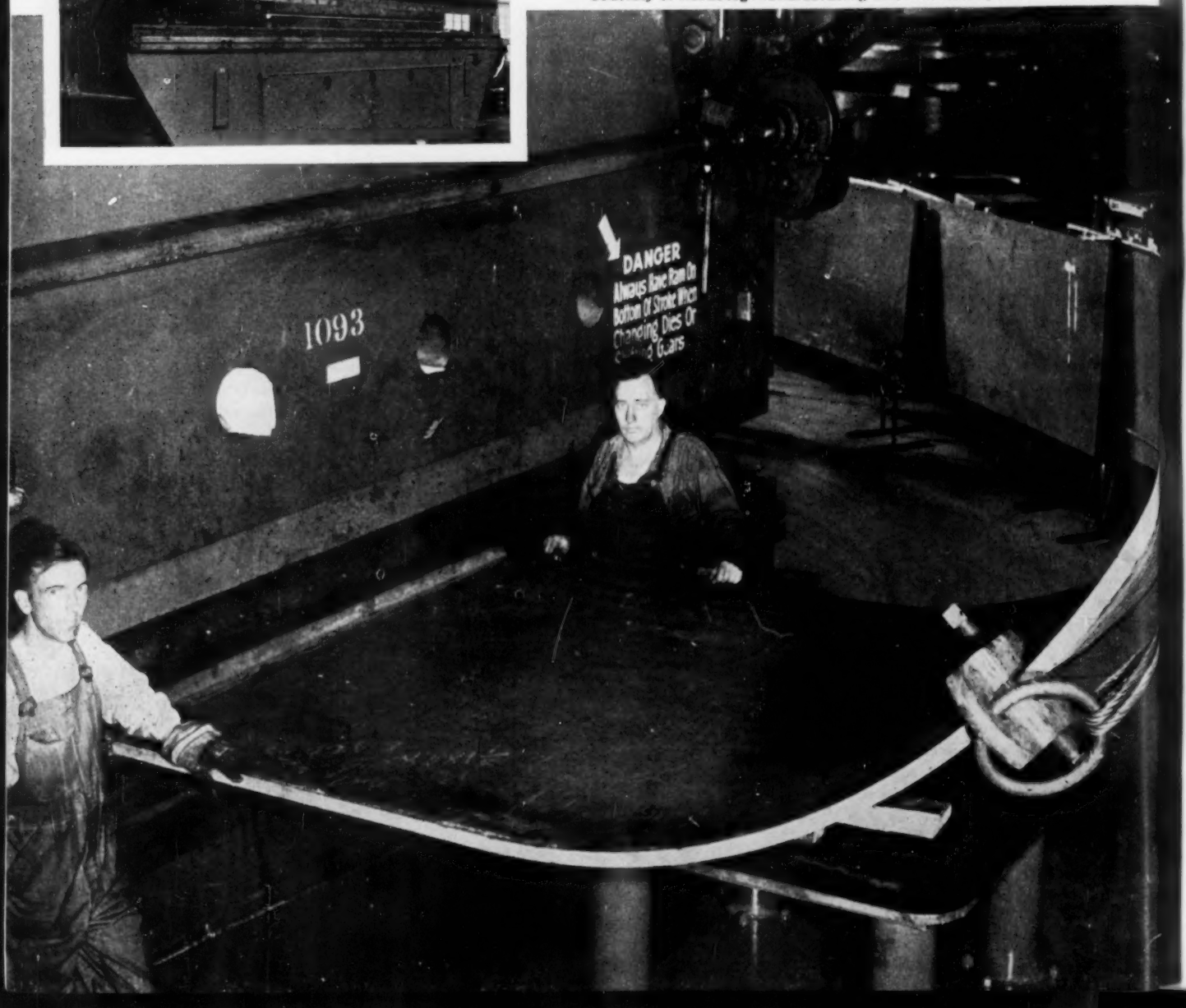


Courtesy of Nordberg Manufacturing Co., Milwaukee, Wis.



IRON AGE

editorial

What! Machine Tools a Bottleneck?

THE machine tool industry is just now getting long overdue price relief. The main thing is that due to the countless hours spent in Washington by some of its members this industry is going to get at least part of a break. Before the present price revisions it was getting it in the neck.

Demands for relief on overtime, shift differential, subcontracting and revising ceiling prices as costs mounted were logical. They were made some time ago. But what happened? The industry was told it was no more important than roller skate makers. It was told that there were other people who needed attention too. But it was not recognized that this indusry had been in a tough depression for some time.

What happened while all this argument was going on; while top machine tool people were waiting quietly outside Washington offices? What happened while other machine tool people fumed and fussed as they tried to get started on defense orders? What happened while some top officials in the defense program did not know the difference between a boring mill and a hand drill?

This is what happened: backlogs piled up; machine tool orders were held up; hiring had to be curtailed; extra shifts could not be put on; and ironically enough some machine tool companies—which are far sounder than the dollar—had to sell inventory to meet payrolls. All because of what? Simply because a realistic approach to the machine tool price picture was not adopted months ago.

Now things look a little better for the machine tool industry—pricewise. This important group is getting something they should have had long ago. Maybe they should never have had to ask for it if things had been handled correctly at Washington in the first place. Well and good. But what about the future?

Some time in the next 6 months some high defense official is sure to come out with the cry that machine tools are a bottleneck—it's being said already by some. If he does, it will be a good time to ask, "Who constructed the neck of the bottle?" The answer is simple. The neck of the bottle—if it is too narrow—will have been made by none other than the very people in Washington who were charged with making the defense effort a success.

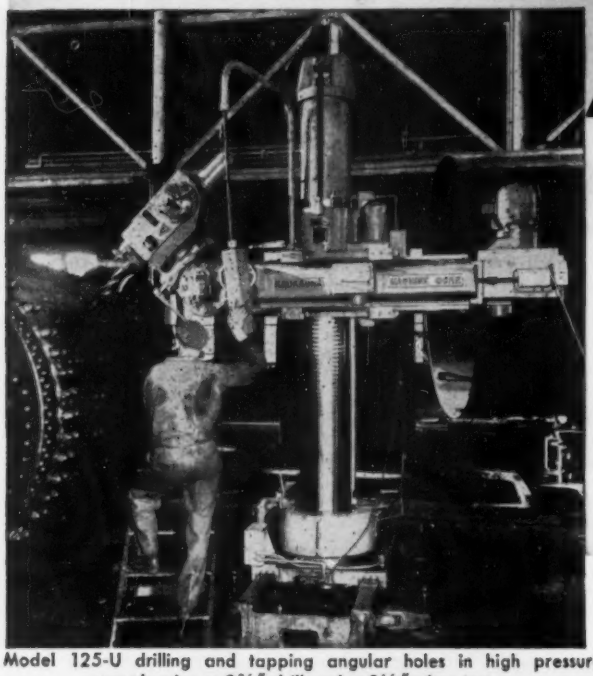
Who tried to keep the neck open? That's simple too. It was the day and night work for months on end by several machine tool people who represented their industry—people whose first thought was their country.

Tom Campbell

Editor

Kaukauna DRILLING and TAPPING Machines

UNIVERSAL AND HORIZONTAL



Model 125-U drilling and tapping angular holes in high pressure vessels using a 2¾" drill and a 2½" pipe tap.

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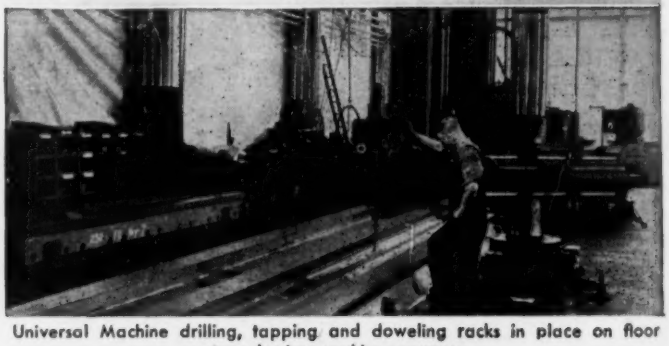
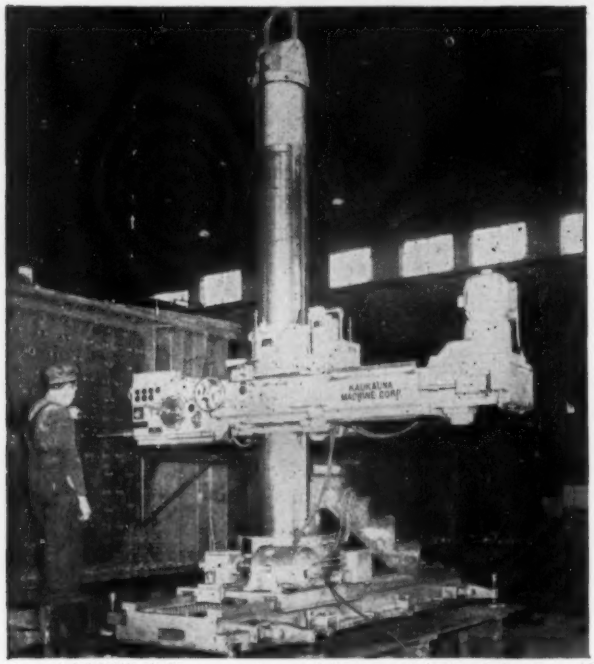
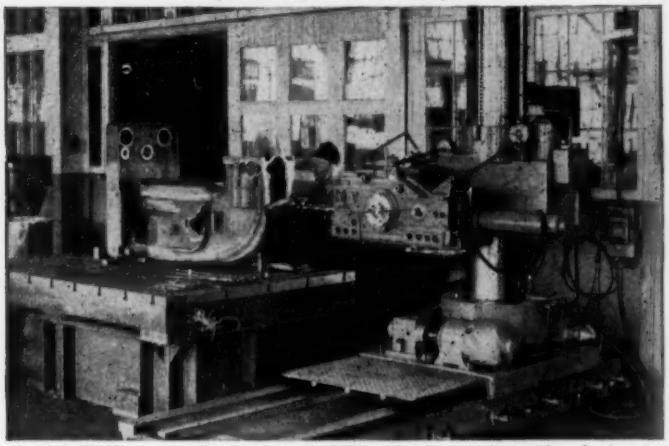
Almost any casting or weldment—of almost any size and shape—can be drilled, tapped or spot-faced in any location accurately, quickly and easily with a KAUKAUNA Machine. Furnished with Universal Head with compound swivels, Tilting Head or Horizontal Head, all with 360° column swivel. Horizontal traverse on runway and vertical traverse on column to suit requirements. For portable or fixed location use.



Universal Machine drilling, tapping and doweling racks in place on floor type boring machine runways.



Model 125-HR drilling, reaming and back spot facing holes in a 40 cu. yd. bucket.



Model 1030 on production setup, drilling, boring and tapping horizontal holes in milling machine bases, columns, headstocks and tables.

Cut your costs on setup time, crane time, fixturing and machine hours. *Write for Catalog.*

KMC

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IRON AGE *newsfront*

news methods and product forecast

► Look for steel scrap to get a whole lot tighter this fall. A major factor in the shortage will be cutbacks in auto and other consumer durable goods schedules. These sources usually permit a summer buildup. Defense production--such as it is--will not take up the slack.

Several mills which rely very heavily on scrap are down for this entire week. The holiday will help them build up puny scrap stocks.

► Peace may or may not come from Russia's cease-fire proposal but if it does it won't mean any more steel for U. S. civilian consumption this year. Government orders will not be cut back or cancelled and planned expenditures will be made. Defense supporting industry will push for steel and there's no slack to be had from an end to scare buying because there hasn't been any for months.

► A priming coat for nonferrous metal painting has been developed in England in ready-to-use form. It is reported to eliminate the need for sanding or pre-treatment. The product etches its way into the base metal as it drys.

► A new shell forging setup makes maximum use of materials handling techniques to the point where there is no manual handling at all from the billet stage right through forging and machining of 90 to 120-mm shells.

► Carbonitriding is growing fast, according to a recently completed survey on carbonitriding practice. A careful estimate indicates that more than 250 plants now use the process, employing about 400 furnaces. A definite trend toward use of higher carbonitriding temperatures is also revealed by the survey.

► A study to be included in the second report on the Air Force machinability program--to be released in August or September--will point to significant increases in machinability of certain alloys obtained through resulfurization to around 0.1 pct, which is higher than normal resulfurization goes.

► The shortage of steel plate is causing some oil companies to tear down outdated riveted storage tanks and refabricate them. The riveted portions of the tanks are sheared off and the plate reformed and welded into newer storage tank designs.

► A tool steel company is working on an electric melting refining process through which it recovers most of the valuable alloys ordinarily lost in grinding wheel dust and mill scale. All wastes containing over 0.5 pct tungsten are refined.

► Heavier tonnage CMP orders will be out within the next few weeks. Smaller orders--for less than 100 tons--have been processed more quickly, apparently to clear the way for consideration of the bigger and harder-to-handle requests.

► A chlorine-carrying inert gas process for refining aluminum scrap has been developed in Germany. It permits elimination of gases, oxides, nitrates and carbides--so as to yield unusually high quality refined ingots of virgin aluminum.

A Thrifty Thought

Have you considered using Boron as an alloying agent to help conserve the critical materials . . . Chrome, Manganese, Nickel and Molybdenum?

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IRON AGE *summary*

iron and steel industry trends

Peace would mean no easing in steel supply this year . . . Boron steels are replacing many alloys . . . Steel rate dips on holiday.

No Extra Steel—Peace in Korea will not mean any easing in steel supply this year. Manufacturers who now face limitations on their supplies of metals cannot expect any improvement in their picture for the balance of this year. In fact, indications that most metals will be generally hard to get even in the first quarter of 1952 still stand.

Most of the alloy steels now used in automobiles will be unobtainable before 1951 is over. This does not mean that auto manufacturing—already cut sharply by material shortages—will grind to a stop. But it does mean that makers of cars, trucks, farm implements and even some military goods will have to use substitutes. And they will have to move fast on these substitutes if they expect to keep their plants running later this year. The alloy shortage is the most critical this nation has ever faced.

Boron Steels—Fortunately, the substitutes—new boron steels—are now available as a result of intensive high-speed research by automotive engineers in cooperation with steel producers and defense officials. But since few manufacturers know how to use these new steels, the problem is one of getting information on them to the metalworking industry as fast as possible. To help in that task, THE IRON AGE this week is beginning a series on boron steel (see p. 79).

No Arms Cutbacks—Neither this situation nor the general shortages of metals will be affected for some time even if peace finally comes in Korea. Defense appropriations already made will be spent on schedule. Cutbacks on civilian goods production will also proceed on schedule. There was no extra appropriation for the Korean war—the special appropriation for that purpose ran only to June 30. Many essential industries such as oil and gas would gladly take up any slack caused by a drop in consumer goods demand. But there are no signs of any softening in that direction.

Buying Peak in '52—Actual purchasing of materials under defense contracts is gathering speed month by month, heading toward a peak early in 1952. The expectation is that in this third quarter about 85 pct of finished steel will be controlled and the figure will probably approach 100 pct in the fourth quarter. Bar, plate and structural steel is already almost 100 pct controlled. Conversion deals are having a rough time because of the growing scrap shortage. So-called free market steel—except for imports—will be almost microscopic in size by Christmas.

Small Orders First—CMP orders are beginning to appear on mill books this week. Orders for less than 100 tons are apparently being processed first by CMP to clear the way for consideration of the larger requests, which should be out within 2 weeks. The Military now knows exactly what its requirements are but few other "Claimant Agencies" do. Until they do, it will be impossible to schedule orders and production properly. So the current confusion between DO orders and CMP will continue for some time.

Rate Dips—Instead of suspending operations for the July Fourth holiday, as they do in "normal" times, most steel mills operated their furnaces this week, paying time and a half. Where shutdowns were made, most were in finishing mills, not in melting operations.

Scrap Headache—However, enough open-hearth operations were suspended to drop the steel operating rate this week to 101 pct of rated capacity, down two points from last week's rate. The scrap shortage was the deciding factor in a number of shops, some of which closed for the entire week—most of them being plants almost entirely dependent on scrap.

(Nonferrous summary, p. 150)

Steel saved civilization at Vienna

MODERN history begins with the record of conflict between Christians and Moslems--six centuries of wars that opened with the Crusades and saw the Turks capture Constantinople in 1453.

More than 100,000 Turkish janizaries and cavalry besieged Vienna in 1683. For two months, to quote the diary of an eye witness, "The enemy continued playing their cannon and granadoes. But the city walls were strong, Christian cannon were bigger and more numerous and ammunition more plentiful." Finally came a day when the officer's journal reported, "The enemy did not play their cannon so fast. It was confirmed that they had no great provision of bullets, inasmuch as they shot back not only our bullets, but also pummels of swords and all sorts of iron and stones."

At last a great Christian relief army was assembled. "They made an attack in the best order that ever army did. The enemy, forced always to give back, were put all into confusion. They betook themselves to flight, leaving all their provisions, ammunition, cannons and tents --the greatest part rendered unfit for farther use by our great guns."

Never again did the Turks seriously menace Christendom. Western civilization had been saved once more by its supremacy in the use of iron and steel. To aid our survival America's free private industry is producing steel at the highest rate ever known--and still expanding. The question remains--Will America use enough of this tremendous steel production to guarantee the continued supremacy of Western, Christian civilization?---We believe the answer is yes!

YOUR SCRAP IS NEEDED — YOUNGSTOWN

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SHORTAGES AHEAD

When *new* sources are needed fast, directory *advertisers* receive preferential attention. And MacRAE'S BLUE BOOK is preferred—at most industrial purchasing points—for its accuracy, completeness and accessibility.

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ALL in ONE BOOK

Dear EDITOR

letters from readers

From The Heart

Sir:

It is not often that one takes time out to write complimentary letters. As one of the radio commentators said the other day, "fan mail consists mostly of complaints or criticisms—when the listeners agree with you, they say nothing. It is only when they disagree or have some gripe that they let you know about it."

After reading "Heart or Head?" in your June 14 issue—I agree so wholeheartedly, that I feel the editorial deserves reading by the many and should be reprinted in "Reader's Digest."

Won't you submit your editorial to "Reader's Digest" for their consideration? It is too powerful to bury—or save for only the steel and metal industry.

M. B. HARRIS
Secretary
Ships & Power Equipment Corp.
Elizabeth, N. J.

Spreading Courtesy

Sir:

Your May 24 issue carried an editorial entitled "Courtesy—A Two-Way Street" by Tom Campbell. We would like to have your permission to reproduce this editorial for distribution to department heads in our company.

M. A. WEIKART
Perfex Corp.
Milwaukee

Sir:

I enjoyed very much the editorial "Courtesy—A Two-Way Street."

I would appreciate your permission to have this editorial reprinted for distribution to our customers.

S. POLK
President
Polk Bros.
Central Appliance & Furniture Co.
Chicago

Coming Soon

Sir:

Would you please send us ten copies of your "Directory of Tool Steels"?

V. BAROTH
Ajax Steel & Forge Co.
Detroit

We have good news for you and our many other readers who have requested copies of the "Directory of Tool Steels." We expect to have it published by Aug. 15.—Ed.

Surface Treatment

Sir:

Will you please advise us where we can get further information regarding the use of magnesium as a surface treatment for protection against corrosion and heat? We refer to the last item on the Newsfront page of your June 14 issue.

E. B. ROSS
Willard Equipment Ltd.
Vancouver, British Columbia

Our item referred to a new surface treatment for magnesium, not the use of magnesium as a coating. For further information write to H. A. Evangelides, Pitman Dunn Laboratories, Frankford Arsenal, Philadelphia, Pa., who developed this new treatment.—Ed.

New Spectrograph

Sir:

The article on p. 104 of your June 7 issue by B. J. Tufty on the direct reading spectrograph being developed in the laboratory of the Campagnie Radio-Cinema in Paris appears to be very interesting.

We are interested in obtaining more information on this type of instrument with the hopes that it possibly can be used in the analysis of all types of aluminum alloys.

G. E. McCARTHY
Chief Chemist
Reynolds Metals Co.
Phoenix, Ariz.

For further details on the direct reading spectrograph write to Mrs. B. J. Tufty, 19 Rue de la Marne, Verrieres Le Buisson, Seine-et-Oise, France.—Ed.

Illustrations Wanted

Sir:

Mr. Allen G. Gray, of Products Finishing magazine, has written our Mr. Durkin asking permission to use two illustrations from his article "Sealing of Anodized Aluminum Increases Corrosion Resistance" which appeared in your May 10 issue.

He is anxious to cite the article in his section entitled "Spotlighting Finishing Progress." Mr. Durkin has no objection to the use of the information and the photographs. Do you?

R. H. BUSH
General Electric Co.
Schenectady

No objections.—Ed.

Nodular Iron

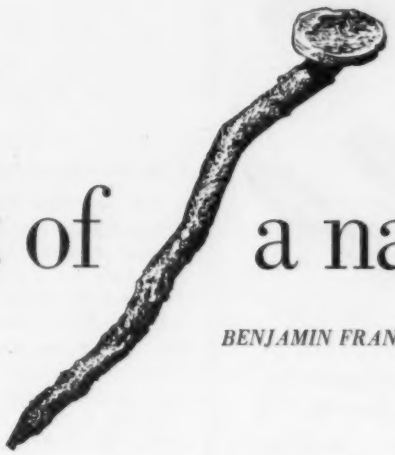
Sir:

Your Apr. 19 issue contains an article "Improved Tests Evaluate Nodular Iron" by W. W. Austin, Jr., in which I am extremely interested. I would appreciate tear sheets of this article.

G. C. OLSON
Melting Superintendent
Atlas Steels Ltd.
Welland, Canada

"For the want of a nail the shoe was lost,
For the want of a shoe the horse was lost,
For the want of a horse the rider was lost,
For the want of a rider the battle was lost,
For the want of a battle the Kingdom was lost . . .

and all for want of a nail"



BENJAMIN FRANKLIN, "Poor Richard," 1758

The fate of nations often hangs on little things. Take this rusty old nail. It symbolizes thousands of tons of worn-out machines and broken parts lying useless in our plants, factories, farms, and homes—scrap steel desperately needed today by our steel mills.

You can help make this nail, and all the other scrap you can collect, go to work again . . . in new steel for ships, tanks, and guns required for defense purposes.

So survey your plant now for every last bit of scrap. Then get it to your scrap dealer promptly. This will not only help assure the nation of the arms needed to preserve our freedom, but it will also mean more steel for your own products tomorrow.

ELECTRO METALLURGICAL COMPANY, a Division of Union Carbide and Carbon Corporation.

toughen metal

improve surface

end stock waste

with

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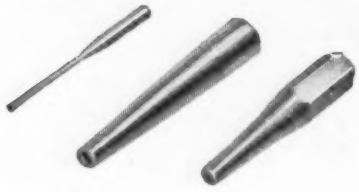

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Swager Department
555 Field Street • Torrington, Conn.

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Please send a copy of "The Torrington Swaging Machine" to:

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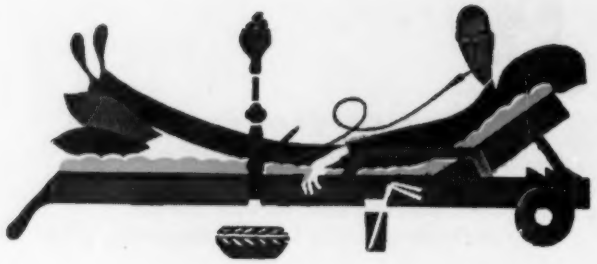


Fatigue Cracks

by Charles T. Post

Business Opportunity

No one but a bride who has been deluged with sterling silver bon-bon dishes or who has received four or five sets of candlesticks can appreciate the spirit of a practical-minded New York outfit which has set up business as the "Brides' Gift Exchange." Its frankly worded advertisement implores newly wedded lassies who have settled down to count the loot to "Exchange your duplicate and inappropriate sterling. . . . Your unwanted bowls, pitchers, trays, etc. —no matter how tarnished, dented or monogrammed — no matter where purchased—are valuable to us. Make your OWN choice from a fabulous collection of more than 5000 unusual values in silver and jewelry."

We can see where this field of metal redistribution offers a big future in almost any city in the land. But we'd like to get our hands on the cynic who gives brides tarnished and dented silver.

Junk Closet

One of our friends was invited to visit a recently married couple for the first time in their spanking new vine-covered cottage, a gift of the bride's parents. In this particular case all of the wedding presents seemed to click, and as the bride showed the visitor around she ticked them off one by one.

"This clock was a gift of the Thorntons . . . the coffee table came from Great Aunt Lucy . . . the lamp from the Beckmans . . . the Peters gave us the candlesticks. Aren't they darling? . . . The water-color came from Uncle Fred," gurgled the bride as they toured the various rooms.

Finally, they came to a closet off the kitchen. As the bride opened the door quickly, she pointed to the loaded shelves, explaining, "This is where we put all the junk we couldn't use." She realized only a moment too late that the visitor's gift was the most prominent piece on the top shelf.

Aptronym

Your f.f.j.'s own Miss Roberts clipped an item reporting the arrest of a Birmingham man on gambling charges. His name, of course, was Lottery King.

Puzzlers

The solution to the train-siding problem would fill this column for weeks to come so we will just say that the maneuver was accomplished with two uncouplings and two back-ups and let it go at that. R. W. Huff, Canton, Ohio, J. L. Vaupel, Central Iron & Steel Co., R. A. Wallace, McDowell Mfg. Co. and L. Scheihtman, Handy Button Machine Co. gave more complete answers.

C. F. Blass, Talon, Inc., has just about caught up now that we have his solutions to the bank robber, the flagpole problem and the row boat problems. C. E. Evers, Shakeproof, Inc., has solved the flagpole puzzle and C. R. Simon, Michael Flynn, Inc., didn't sink on the row-boat problem.

Here's one to take down to the farm on your vacation. All except 8 of the livestock owned by Farmer Jones were horses. All except 6 were cows and all except 4 were pigs. How many horses, cows and pigs did he have?

machine tool high spots

sales inquiries and production

by W.A.Lloyd

Order Stalled — The Congressional extension of the Defense Production Act through July 31 thrust aside for that period the special pricing order that the machine tool industry had for so long struggled to win. The ban on rollbacks put machine tools again under the general pricing order. The industry was moving to action under the terms of Supplementary Reg. 2 to CPR 30.

The changes made conformed identically to those listed in THE IRON AGE story (June 21, p. 110) that heralded the coming of the pricing liberalization.

Satisfaction Guaranteed — The regulation gives the industry practically everything it wanted. Its main points were:

(1) Machine tool builders were permitted to make price adjustments for overtime, shift premiums and subcontracting costs. (It applied to machine tools only and not to other types of machinery).

(2) Machine tool builders were still under CPR 30 and are obliged to file ceiling prices under CPR 30 by July 2.

(3) Machine tool builders were authorized to adjust the prices used in their base periods for increased costs due to overtime, which may be determined as a percentage of total labor cost based on a selected payroll period or on the basis of increased overtime cost of each classification of labor in the plant.

Figuring Shift Premiums—Price adjustment for shift premiums could be figured in a similar manner, except that shift premium hours and shift premiums are used instead of overtime hours and overtime premiums.

In the adjustments for subcontracting costs, machine tool builders could choose any of three ways. These were: where a customer was charged more for a particular machine tool or attachment because it was built in a subcontractor's plant at higher cost; where the price to a customer is increased because part of it represents the increased cost of subcontracting parts of the machine tools or machine tool attachment being sold him; and where a machine tool builder distributes the increased cost of subcontracting over the entire sale of his machine tools and machine tool attachments or over a portion of his entire sales.

Refund Provision—The regulation also made provision for refunds. For example, if a machine tool builder found at the end of the 12-month period that his estimates have exceeded his actual costs by over 5 pct, refunds of this excess must be made to all customers receiving deliveries during that period within 60 days. If a builder's estimate exceeded his actual costs by not more than 5 pct, no refund need be made, but his price must be reduced accordingly.

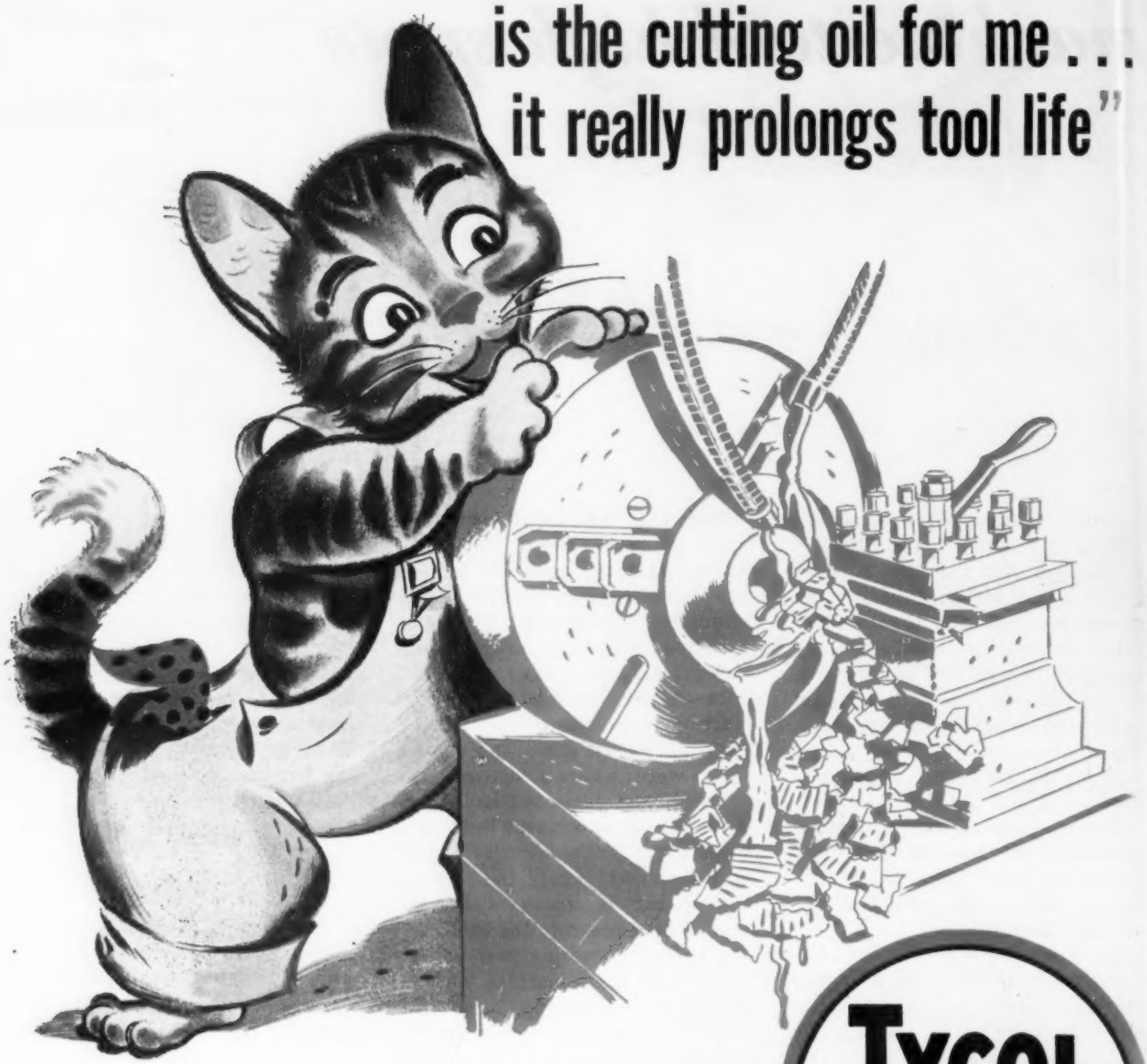
Advance Delivery — In Washington, NPA authorized defense contractors to apply for advance delivery of machine tools needed in vital defense work. Contractors may apply on Form NPAF-76, available at Commerce Dept. field offices. Companies eligible to file such a request must be engaged in direct military or defense supporting production, have purchase orders for machine tools filed with a specific supplier, and have no idle capacity or equivalent production equipment.

Diverting to the Needy—Applications will be screened by NPA, which will direct a machine tool builder or the manufacturer of other metalworking machinery to give priority to the order.

The procedure is simply a method of diverting machines to neediest contractors. Industry spokesmen say, it is not the beginning of a system of bands of priorities.

Fast Writeoffs—Certificates of necessity were granted to the field. Companies and the amounts authorized are: Cleveland Hobbing Machine Co., Euclid, Ohio, $58,599; Sundstrand Machine Tool Co., Rockford, Ill., $45,872; Avildsen Tools & Machines, Inc., New York, $291,000; Acromatic Tool Co., Oak Park, Mich., $52,338; Willard Machine Co., Buffalo, $28,809; The Clark-Aiken Co., Lee, Mass., $83,500.

"Tycol Amulkut is the cutting oil for me . . . it really prolongs tool life"



That's 100% correct! Tycol Amulkut Cutting Oil speeds up production by permitting freer, faster cutting . . . assures uniformly finer finishes. It also cuts cost by reducing spoilage, and prolonging tool life . . . regrindings are few and far between.

Tycol Amulkut is readily emulsified, and is specially designed for use in this form . . . it is available in grades for normal and heavy-duty cutting.

For more information, call your nearest Tide Water Associated office.

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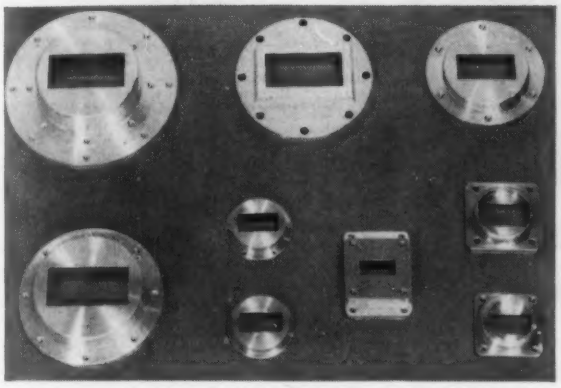
"Bridgeport" MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL

Design of Fixtures and Correct Methods Vital in Machining



Microwave flanges machined from leaded commercial bronze. These flanges are turned, drilled, tapped and broached.

Many screw machine shops are being slowly obliged to add equipment to do secondary operations such as milling, drilling and tapping due to the stepped-up tempo of the war effort.

Since copper alloys have always been considered easy to machine, it is very easy to design holding fixtures much too light. For this same reason, it is quite simple to overlook certain methods which might help to eliminate down-time or step up production.

In milling operations, for example, in many cases fine chatter marks can be traced directly to too light holding fixtures or poor holding devices. Although it is true brass is readily cut, if the milling cutter is set up with an indicator to insure against face and side runout, not only will the cutter last longer but the finish will be better. Seldom is the cutter ground eccentrically. The trouble usually is found in a bent arbor, unaligned out-rigger or spacers with unparallel faces.

Watch Clearance Angles

After several sharpenings, it is necessary on circular milling cutters to regrind clearance angles to prevent rubbing and burnishing. Sometimes it is necessary to step up the revolutions of the cutter to obtain the necessary feet per minute after numerous grindings. Don't be satisfied if the job runs smoothly immediately. Experiment with feed and speed because depth of cut, number of teeth in cutter, width of cut and the general condition of the machine all enter into the picture. Perhaps conditions are such that you can gain higher production and longer tool life with a little experimentation.

Simple steps often can correct irregularities in drilling when accurate, straight holes are required.

When a drill jib suddenly starts to produce work not up to standard often the replacement of worn bushings will solve the difficulty. Bushings should be checked for concentricity as well as size before they are put in a jig.

Check Drill Size

Variations in standard drills can also cause trouble. If a tool setter selects drills which fit the drill bushing with the right amount of clearance much trouble can be avoided.

On the very ductile copper alloys chrome-plated drills often prevent galling. Sometimes fast spiral drills can be used but often the slow spiral type is more advantageous.

One cause of excessive drill wear can be overcome by not permitting the drill point to run in a bushing between operations. By completely removing the drill from the bushing not only is wear reduced but the drill is more rapidly cooled and chips washed away in the coolant.

When a bushing plate is used for drilling it is often necessary to have a split coolant flow—one hitting the top of the bushing and the other striking the work at the point of drill contact. This lower stream will also help to wash away chips during the operation and to clean the locating areas of the jig.

Hand sharpening of taps is quite common in the average shop, but where straight accurate holds are demanded it is advisable to use a drill sharpener.

Automatic drilling attachments for drill presses produce more consistently accurate parts than can be expected on a hand-fed job. This is especially noticeable on small drills where breakage is apt to be high on hand-fed operations.

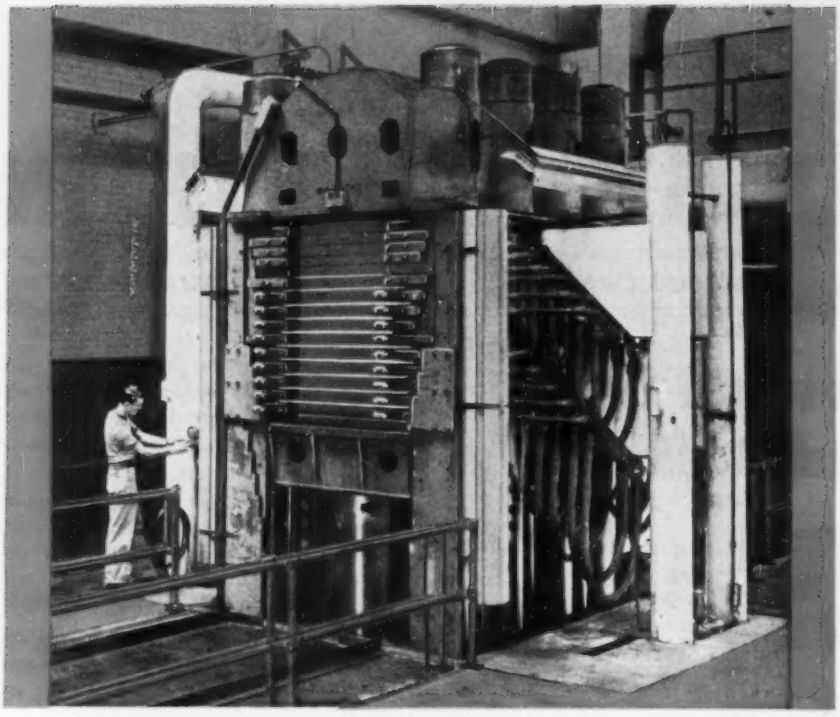
Check Drilling First

When holes fail to clean up during a reaming operation, check the drilling first. A reamer will only follow the drilled hole, it will not straighten it. Although leaving too much stock for a reamer to cut is a common error, most of the trouble comes from too little stock. The reamer then burnishes rather than cuts and undersize holes usually result.

Tapping of leaded copper-base alloys rarely proves a difficult job. However, in the non-leaded alloys and copper, polished flute taps which have been chrome-plated usually give satisfactory results. The plate both reduces wear and galling.

On through holes the chip driver, or gun tap, usually does an excellent job. With blind holes a standard tap is advisable unless there is plenty of chip clearance below the tapped area.

In drilling, reaming, tapping and milling it is generally desired to have well-directed, good flow. Just as in screw machine work, the choice of cutting compound depends on the alloy being machined. As the ductility of the alloy increases so should the viscosity of the coolant. Perhaps the main variation from this rule is in tapping where the speeds are normally such that little heat is generated and a heavy cutting compound is advisable to give the greatest amount of lubrication possible. (6635)



NATIONAL PLASTIC thermo-sets Plastic Laminates with 3500-ton

FARQUHAR HYDRAULIC PRESS

The National Plastic Products Company, of Odenton, Maryland, required a hydraulic press for use in the thermo-setting of their NEVAMAR Plastic Laminates . . . a press that would be able to mold this material to very close tolerances.

Farquhar engineers supplied the answer with this built-to-specifications Hydraulic Press. The complete, self-contained hydraulic pumping unit has a capacity of 3500 tons. Each of the 15 hot plates has a clear working area of 50″ x 100″. Total working stroke: 49″.

The efficient Farquhar hydraulic circuit operates with a minimum number of valves —thus reducing maintenance cost considerably.

Its production problem solved, National Plastic is now successfully turning out Plastic Laminates to their exacting requirements.

Farquhar Presses Cut Your Costs

Just one more example of cost-cutting Farquhar performance in heavy production. Farquhar Presses are built for the job . . . assure faster production due to rapid advance and return of the ram . . . greater accuracy because of the extra guides on moving platen . . . easy, smooth operation with finger-tip controls . . . longer life due to positive control of speed and pressure on the die . . . long, dependable service with minimum maintenance cost!

Farquhar engineers are ready to help solve whatever production problem you may have. Give them a call.

Send for Free Catalog showing Farquhar Hydraulic Presses in all sizes and capacities for all types of industry. Write to: A. B. FARQUHAR Co., *Hydraulic Press Division*, 1503 Duke St., York, Pa.

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HYDRAULIC PRESSES
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DATES *to remember*

Sept. 6-7—Rail Steel Bar Assn., semi-annual meeting, Broadmoor Hotel, Colorado Springs. Association headquarters are at 38 S. Dearborn St., Chicago.

Sept. 10-14—Instrument Society of America, national instrument conference and exhibit, Sam Houston Coliseum, Houston. Society headquarters are at 921 Ridge Ave., Pittsburgh.

Sept. 10-14—International Foundry Congress, Brussels. All correspondence should be addressed to the general secretary, Foundry Congress, c/o Fabrimetal, 17 Drapiers St., Brussels, Belgium.

Sept. 11-13—Society of Automotive Engineers, tractor meeting, Hotel Schroeder, Milwaukee. Society headquarters are at 29 W. 39th St., N. Y.

Sept. 21-23—National Assn. of Waste Material Dealers, Inc., annual fall meeting, Saranac Inn, Saranac Lake, N. Y. Association headquarters are at 271 Madison Ave., New York.

Sept. 24-26—National Truck Body Manufacturers & Distributors Assn., annual convention and supplier's exhibit, Haddon Hall, Atlantic City, N. J. Association headquarters are at 346 Connecticut Ave., N. W., Washington.

Sept. 25-26—Steel Founders Society of America, fall meeting, The Homestead Hot Springs, Va. Society headquarters are at 920 Midland Bldg., Cleveland.

Sept. 25-28—American Society of Mechanical Engineers, fall meeting, Hotel Radisson, Minneapolis. Society headquarters are at 29 W. 39th St., New York.

Sept. 26-28—National Metal Trades Assn., annual convention, Palmer House, Chicago. Association headquarters are at 122 S. Michigan Ave., Chicago.

Sept. 26-29—Marking Device Assn., national convention, Edgewater Beach Hotel, Chicago. Association headquarters are at 134 N. LaSalle St., Chicago.

Oct. 1-4—Assn. of Iron & Steel Engineers, annual convention, Sherman Hotel, Chicago. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

Oct. 3-6—Pressed Metal Institute, annual meeting, Hotel Drake, Chicago. Institute headquarters are at 13210 Shaker Square, Cleveland.

Oct. 8-13—Concrete Reinforcing Steel Institute, semiannual meeting, Grove Park Inn, Asheville, N. C. Institute headquarters are at 38 S. Dearborn St., Chicago.

Oct. 10-12—Porcelain Enamel Institute, annual forum, Ohio State University, Columbus. Institute headquarters are at 1010 Vermont Ave., Washington.

Oct. 14-19—National Metal Congress & Exposition, Detroit. American Society for Metals headquarters are at 7301 Euclid Ave., Cleveland.

Oct. 15-18—American Gas Assn., annual convention, St. Louis. Association headquarters are at 420 Lexington Ave., New York.

FREE *publications*

These publications describe money-saving equipment and services... they are free with no obligation... just fill in and mail the postcard.

Hardening furnace

A high speed steel hardening furnace is described in a new leaflet. Designed to meet the exacting requirements of modern tool room practice, the furnace has evolved as a result of experience and observation of heat treatment problems. Important feature is rapid attainment of stable temperatures within the working range of 1100°C to 1350°C in the lower chamber; the upper chamber is heated by products of combustion from the lower, and will achieve a temperature in the region of 800°C. Temperature conditions are controlled by manipulation of the air valve only. *The Incandescent Heat Co., Ltd.*

For free copy insert No. 27 on postcard.

Radio in industry

Cutting industrial costs through use of two-way radio is the subject of a new 8-p. booklet. This application of radio to industry enables the executive to maintain contact with vehicles, remote locations; makes for more effective use of men and equipment. Men and machines can be quickly shifted as new demands arise. *Radio Corp. of America.*

For free copy insert No. 28 on postcard.

Machine tools

A comprehensive new 104-p. book listing capacities and principal working data on a large number of machine tools is available. Also described are heavy production machinery designed for increased production at lower cost. *Morey Machinery Co., Inc.*

For free copy insert No. 29 on postcard.

Spectrochemical analysis

Spectrochemical analysis, a process by which detectable chemical elements are identified, is the subject of a 12-p. bulletin. Advantages of grating spectrographs are described. Performance specifications, embracing speed resolution, operation and other important factors in the use of this instrument are discussed. *Baird Associates.*

For free copy insert No. 30 on postcard.

Oscillating conveyers

Link-Belt Flexmont oscillating conveyers are described in a new 4-p. leaflet. Positive action, cleanliness, compactness and minimum maintenance are advantages of this type conveyer. Numerous drawings illustrate construction of the machines. Power and capacity data are also included. *Link-Belt Co.*

For free copy insert No. 31 on postcard.

Turn to Page 146

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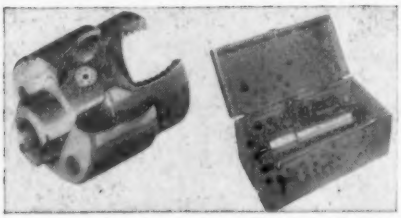
new equipment

Continued

Corrugated all-steel van has nailable steel flooring

Fruehauf's new model FDL corrugated all-steel trailer has all the strength advantages inherent in its welded one-piece high tensile steel construction, while at the same time, due to its nailable floor, it is 500 lb lighter than composite van trailer design. No structural wood is employed in the trailer. The unit is supplied in both closed dry-freight and open-top van types. It is built in 20 to 35 ft lengths, with capacities of 20,000 and 25,000 lb in the single axle models; with tandem axles it is rated at 18,000 lb per axle. The surfaces of the nailable steel floors will withstand shock and grinding of rough freight, fork truck loading as well as abrasion, impacts, rust and corrosion. Sections of the floor are readily replaceable. *Fruehauf Trailer Co.*

For more data insert No. 5 on postcard.



Samson boring chuck offers fast setup features

The head of the Samson offset boring chuck offers unusual features. The block operates in dovetail ways and the block, cover and body, all of which are machined from the solid and ground, are lapped on contact areas for rigid fit of the block and precision setting. Micrometer offset screw offers adjustment to 0.001 in. *Last Word Sales Co.*

For more data insert No. 6 on postcard.

Metal primer

Rustygon, a prime coat for metal surfaces, is a chemical that dissolves and prevents rust. No oil is used in its manufacture, and its coefficient of expansion and contraction being similar to metal permits it to move with the metal, avoiding cracking and blistering. The primer is applied with rag, brush, spray or by dipping the object. *Gensco Chemical Div., General Steel Warehouse Co., Inc.*

For more data insert No. 7 on postcard.

Synthetic rubber sealer

Effective for sealing irregular voids between metal surfaces, a synthetic rubber sealer is extruded in rope-like dimensions, in varying shapes and lengths for different production lines. When pressed into a seam and tightened between metal surfaces, it seals the joint like a rubber gasket. When heated, it swells about 50 pct and cures to a tough flexible mass, providing a sponge-rubber type seal. The sealer consists 100 pct of solids, has no fire or toxicity hazards, no shrinkage problem and no hardening in the container. *Minnesota Mining & Mfg. Co.*

For more data insert No. 8 on postcard.

Turn to Page 38

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Postcard valid 8 weeks only. See above. 7/5/51

Name .....
Title .....
Company .....
Co. Address .....
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THE IRON AGE, New York 17

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THE IRON AGE, New York 17

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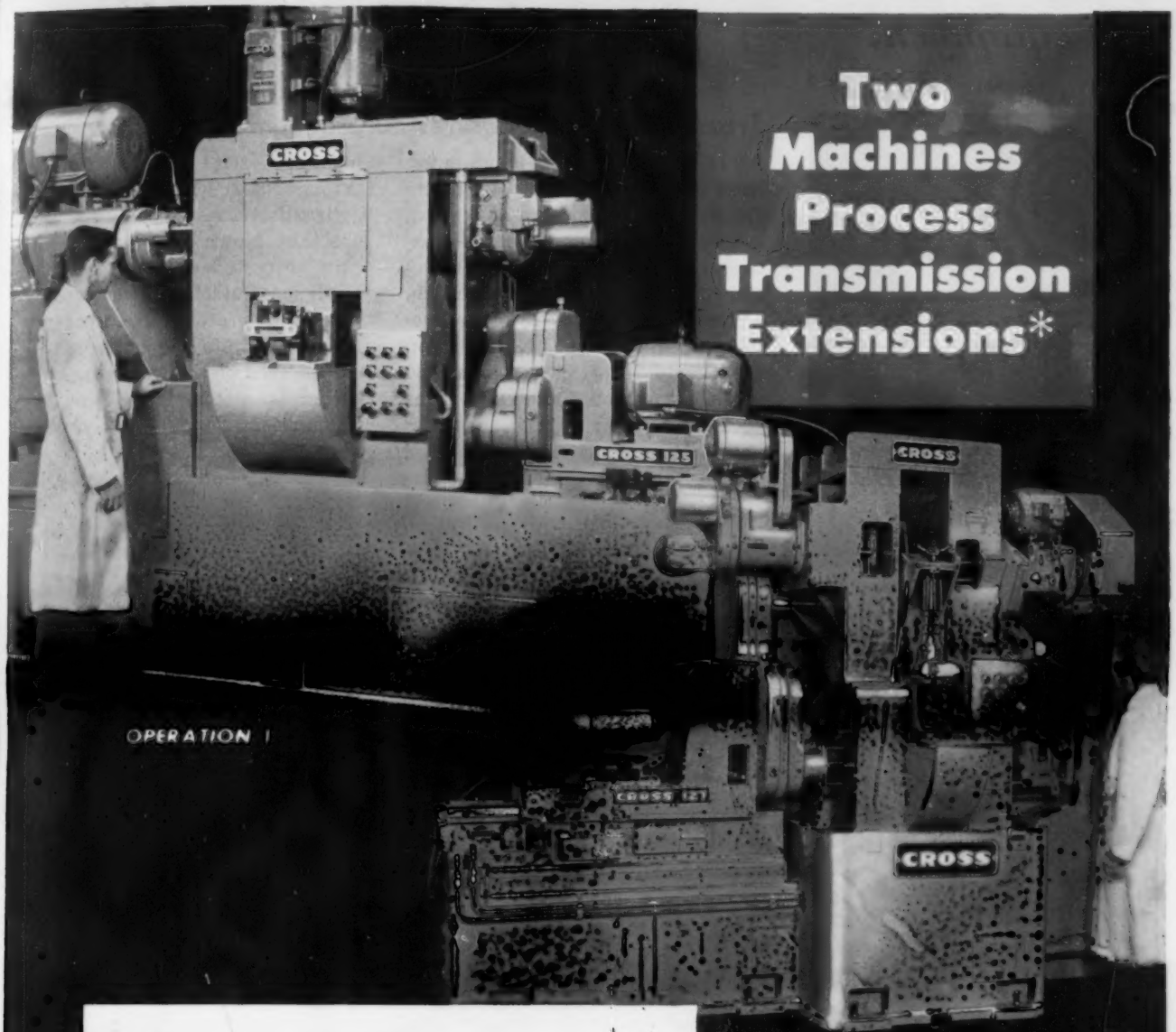
Two Machines Process Transmission Extensions*



OPERATION 1

OPERATION 2

★ Operation 1: bore both ends; face large end; ream flange holes in large end; oil groove small end; chamfer and tap two holes in mounting flange.

★ Operation 2: mill mounting flange; drill, bore, chamfer and tap speedometer hole complete; drill, chamfer and tap two inspection cover holes.

★ 125 pieces per hour at 100%.

★ Features: J.I.C. standard construction; power operated indexing trunnions; fluid motor drive for indexing; single point tool for cross-facing flange of large end.

*Except for finish bore

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

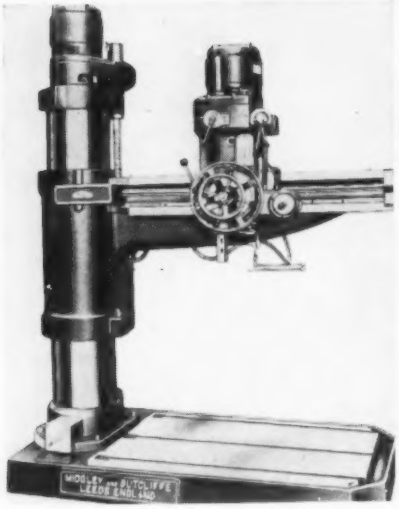
new equipment

Continued

Transfer machine features autosequencing control

All oil passages and lightening holes in cast iron alloy crankshafts are drilled with a new 43-station, automatic transfer machine featuring autosequencing control. Designed to eliminate much handling and maintain high rate of production, the machine has a production capacity of 74 pieces per hr at 100 pct efficiency, or 52 pieces per hr at 70 pct efficiency. Crankshafts are automatically positioned and clamped hydraulically prior to drilling at each station. Indexing throughout the work cycle is by a hydraulic transfer-type unit. Holes are then blown out and automatically inspected at the last station. High speed steel tools revolve at 40 fpm with a feed of 0.008 per revolution on lightening holes and controlled feed on oil passages. Lubrication is motor driven and fully automatic. *Snyder Tool & Engineering Co.*

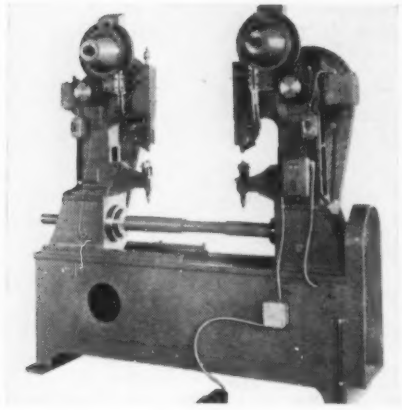
For more data insert No. 9 on postcard, p. 35.



Radial drill has capacity of 1¾ in. in mild steel

Rigid and compact design having easy and rapid control by centralized levers features a new radial drilling machine. Drive is all-electric, with one motor for drilling and one for elevating power, both controlled by a single switch on saddle. Driving gears are chrome nickel steel, heat treated and ground on the teeth; shafts are high carbon heat treated steel; all run in ball bearings. The base plate of rigid construction has three T slots running full length. Coolant drains along channels around the base to a large interior reservoir. Arm is box type construction, swings completely through 360°. Spindle has No. 4 Morse taper nose. Quick hand traverse, fine hand feed and automatic feed to the spindle are provided, and an automatic depth trip permits knocking off at any predetermined depth of hole. Two ranges of 12 spindle speeds are provided from 20 to 1800 rpm. Lubricating oil pumped to saddle and gears runs through sight glass. *British Industries Corp.*

For more data insert No. 10 on postcard, p. 35.



Dual riveter sets two rivets at a time, saves labor

A new Dual Rivetor has been designed to save time and labor in assembly and riveting. It is equipped with 10-in. hoppers, and tooled to automatically feed and set two ¼ in. diam x ⅝ in. long wagon box head rivets at a time in elevator chain and raddle assemblies for farm implements. The machine consists of two 8-in. Model R Rivitors, mounted face to face on a common base, adjustable for rivet spacings ranging from 2½ to 18 in. center to center. One motor drives both flywheels, which are synchronized by a combination gear and chain drive arrangement. Both clutches are tripped by solenoids, connected to a single foot switch. *Tomkins-Johnson Co.*

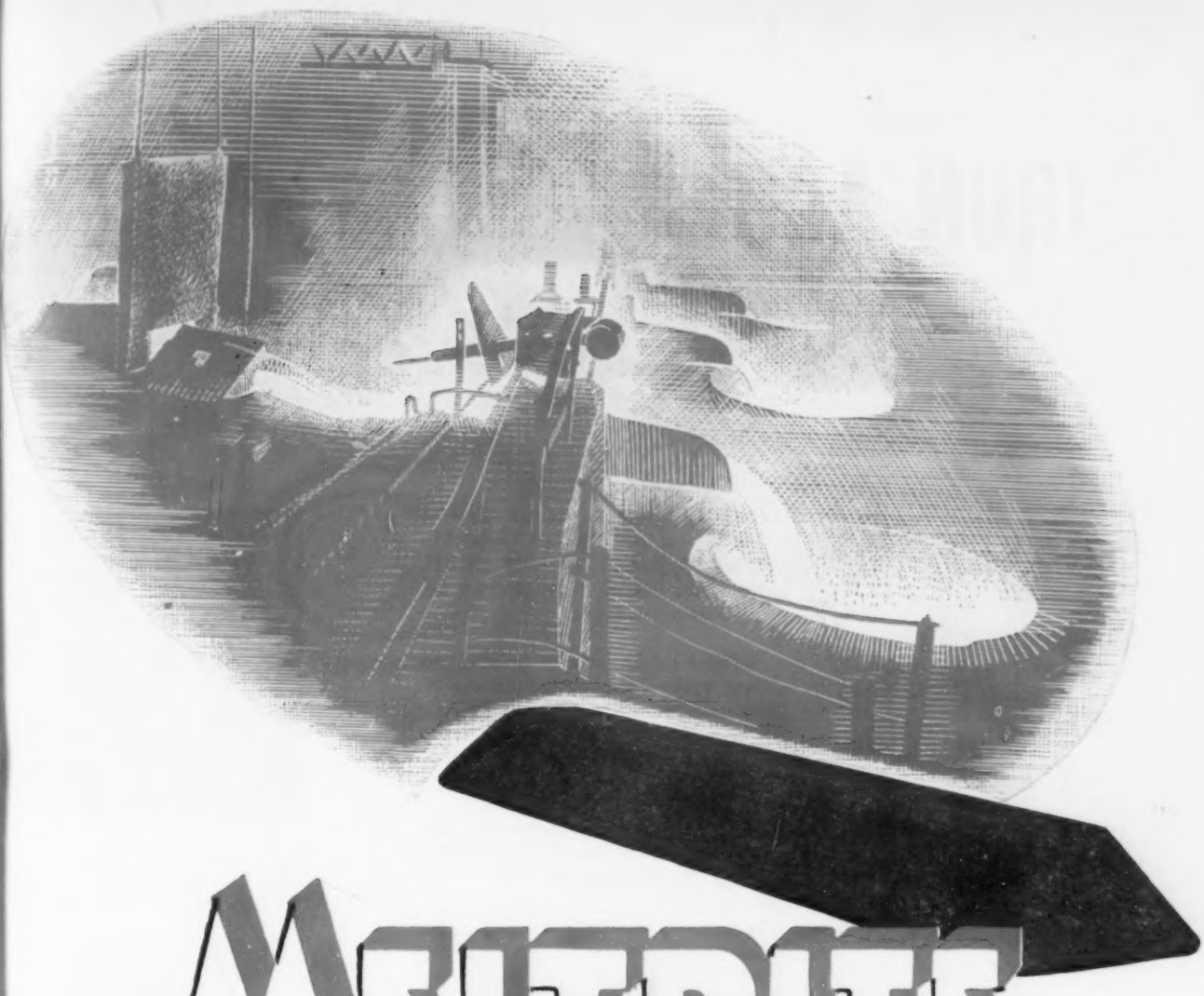
For more data insert No. 11 on postcard, p. 35.

Small tractor can pull 10 loaded trailers

Low cost, maneuverability and dependability are claimed for a small tractor designed for crowded, congested areas. The model 3600 is powered with a 13 hp Wisconsin engine through an automotive type clutch and three speed and reverse transmission. Ten loaded trailers can be pulled with this tractor, and a loading space of 11 sq ft on the tractor itself can be utilized for additional loading. *Kalamazoo Mfg. Co.*

For more data insert No. 12 on postcard, p. 35.

Turn to Page 130



METRITE

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MORE USED THAN ANY OTHER MERCHANT PIG IRON

SIXTY-EIGHT YEARS OF SERVICE TO INDUSTRY

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UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

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IRON AGE *introduces*

S. D. Baumer, appointed vice-president of the Equipment Manufacturing Div. of AIR REDUCTION CO., INC., New York.

L. W. Coquillette, appointed assistant to the vice-president of KEOKUK ELECTRO-METALS CO., Keokuk, Iowa.

J. D. Streett, elected president and treasurer of the LACLEDE-CHRISTY CO., Chicago, succeeding D. N. Watkins, who resigned. **A. B. Agnew,** named president of the Laclede-Christy Co. of Pennsylvania, a subsidiary, and also vice-president in charge of operations and a director of the parent company.

John Gribbel, II, appointed vice-president, assistant to the president and **Leslie G. Carter,** secretary-treasurer, of the RIVERSIDE METAL CO., Riverside, N. J.

C. J. Gerker, named head of the Industrial Sales Div. of the CLEVELAND CHAIN & MFG. CO., Cleveland.

W. D. Espy, elected vice-president of LEAR, INC., Grand Rapids. **A. Durham,** made assistant secretary and assistant treasurer, and **George K. Otis,** assistant secretary.

Martens H. Isenberg, elected to the board of directors of COMBUSTION ENGINEERING - SUPERHEATER, INC., New York.

Harry Kelly, made purchasing agent for the Henderson, Nev. plant of TITANIUM METALS CORP. OF AMERICA, New York.

Lionel E. Booth, becomes director of the Salt Lake City office of HARDINGE CO., INC., York, Pa.

John A. Silver, appointed director of sales for AMERICAN WHEELABRATOR & EQUIPMENT CORP., Mishawaka, Ind. **E. B. Rich,** becomes general sales manager.

Norman R. Amberg, appointed assistant works manager and **Harvey W. Wesenberg,** supervisor of materials handling, for the Philadelphia Div. of the YALE & TOWNE MFG. CO., New York.

L. E. Menns, appointed Pacific Coast sales manager of the BRIDGEPORT BRASS CO., Bridgeport, Conn.

Jack C. Hurst, made sales manager of the Pacific Coast Div. of REVERE COPPER & BRASS INC., New York. **Theodore F. Richardson,** becomes district manager of the San Francisco office.

Harvey E. Schroeder, named director of the Los Angeles fittings plant of the PARKER APPLIANCE CO., Cleveland. **R. J. Trivison,** made manager of the Los Angeles Valve Div.; **C. J. Giblin,** manager of Cleveland Valve Div.; and **Scott A. Rogers,** manager of Cleveland Jet Div.

Maurice N. Trainer, elected chairman of the board of DOMINION BRAKE SHOE CO., LTD., Montreal. **Kenneth T. Fawcett,** appointed vice-president of the American Brakeblok and Kellogg Divs.

Glenn Johnson, appointed plant manager of the Welding Div. of LEWIS WELDING & ENGINEERING CORP., Cleveland.

Frank L. Munsey, appointed assistant plant manager at Sandusky, Ohio plant of New Departure Div. of GENERAL MOTORS CORP., Detroit. **Raoul L. Larue,** made factory manager.

L. L. ANDRUS, made vice-president and executive head, Dust & Fume Div., American Wheelabrator & Equipment Corp., Mishawaka, Ind.

WILLIAM HOLDING, made industrial sales manager, Stamford and Salem Divs., Yale & Towne Mfg. Co., New York.

WILLIAM T. McGINNIS, appointed assistant to president, Keokuk Electro-Metals Co., Keokuk, Iowa.

IRON AGE

salutes

Victor A. Crosby

EVER since he left his home town of Kosciusko, Miss., Vic Crosby has been on the move. They say in Detroit that he has moved so fast he hasn't had time to lose his southern accent. That's the way Vic Crosby affects people.

Vic recently was awarded the John A. Penton medal by the American Foundrymen's Society for "outstanding service to the AFS and his contributions to the dissemination of information relating to ferrous foundry metallurgy."

What AFS meant to say is that Vic has a way of transmitting to others his own wide knowledge of foundry work. He is a prolific author and is widely sought as a speaker, both in serious and light vein. He has lectured before AFS and American Society for Metals chapters from Boston to Seattle.

Since 1934, Vic has been metallurgical engineer in charge of sales, service and development in Detroit for Climax Molybdenum Co. He is the sort of person who manages to work harder than perhaps anyone should.

Vic has served actively on so many technical committees of ASM and the Society of Automotive Engineers that he never got around to taking the pointed advice he once gave a busy fellow foundryman: "Go and get a group picture of yourself."

Despite all this, Vic still finds time for community and church affairs. He is a fair to good golfer, shooting in the low 80's. Once a year he attends the annual meeting of the Cafeteria Institute of Technology—a prized honor for any Detroit metallurgist.

IRON AGE *introduces*

Continued

H. H. WUNDERLICH, appointed assistant vice-president — general services of Jones & Laughlin Steel Corp., Pittsburgh.

CHARLES E. CLEMINSHAW, named area manufacturing manager of Los Angeles plant of Parker Appliance Co., Cleveland.

R. EDWARD STEIN, elected vice-president in charge of manufacturing for Lewis Welding & Engineering Corp., Cleveland.

THOMAS E. AKERS, elected president of Dominion Brake Shoe Co., Ltd., Montreal.

Jesse J. Booth, appointed assistant to the general superintendent and **Frank O. Phillips**, division superintendent of maintenance, at the Duquesne Works of U. S. STEEL CORP., Pittsburgh. **Stephen P. Curtis**, made project construction manager of the Fairless Works.

W. R. Burrows and **R. E. Coutant**, promoted to assistants to the managers of engineering and sales, respectively, in the Aeronautic and Ordnance Systems Divs. of GENERAL ELECTRIC CO., Schenectady. **Raymond C. Freeman**, named manager and **Alanson U. Welch**, manager of engineering, of the Welding Divs.

Merten C. Peterson, named Chicago district manager of the Automotive Div. of WARNER ELECTRIC BRAKE & CLUTCH CO., Beloit, Wis.

Donald E. Jahncke, appointed resident controller of the gas turbine plant of Lincoln-Mercury Div. of the FORD MOTOR CO., Dearborn.

T. O. Kuivinen, **R. F. Kymer** and **W. R. Crooks**, made chief engineer's assistants for the COOPER-BESSEMER CORP., Mt. Vernon, Ohio.

George A. Bulmer, named manager of the West Coast branch of INSULMASTIC CORP. OF AMERICA, Pittsburgh.

OBITUARIES

Clarence R. Johnson, 61, district representative for the western sales division of Caterpillar Tractor Co., Peoria, Ill.

James F. McIntire, 68, former president of the U. S. Radiator Corp., Detroit.

William F. Detwiler, Jr., 38, assistant treasurer and director of the Central Cable Corp., Jersey Shore, Pa.

Emil Gundel, 63, associated with Gundel Metal Co., Brooklyn.

Ernest V. Pannell, associated with the British Aluminium Co.

ROBERT L. CAHOON, appointed assistant manager, clad and conversion sales, Lukens Steel Co., Coatesville, Pa.

William G. Clark, appointed Michigan representative for the BILLINGS & SPENCER CO., Hartford.

Frank A. Stevens, Jr., joined the sales staff of PHELPS DODGE COPPER PRODUCTS CORP., New York.

Michael Dufal, elected vice-president of UNIVERSAL LUBRICATING SYSTEMS, INC., Oakmont, Pa.

David McEwen, appointed sales manager of the ROCHESTER MFG. CO., INC., Rochester, N. Y.

John C. Folger, elected a director of IBM WORLD TRADE CORP., Toronto.

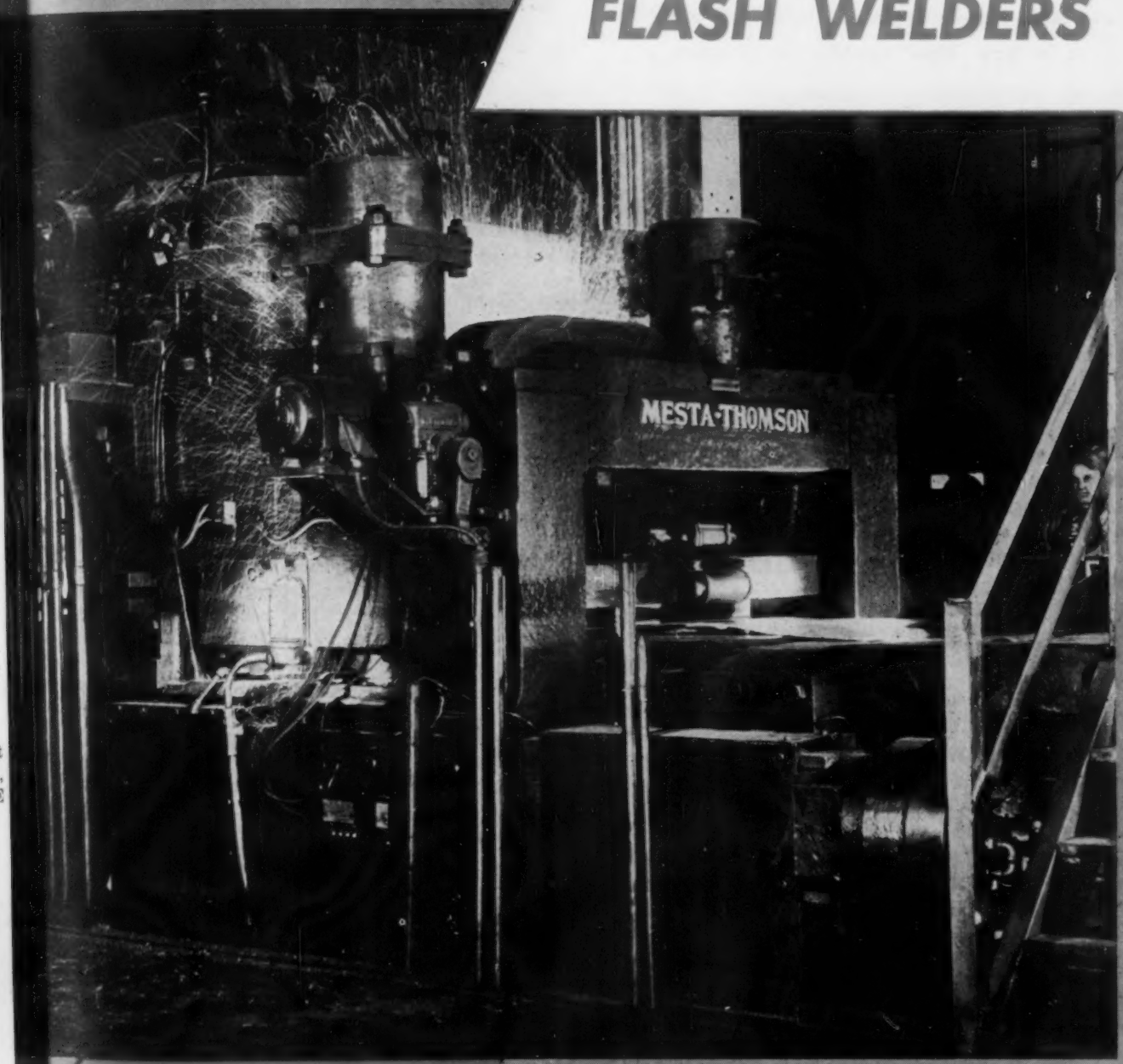
Irving M. Footlik, appointed materials handling consultant of STONE CONTAINER CORP., Chicago.

William J. Muller, appointed export manager for Southern Alkali Corp., subsidiary of PITTSBURGH PLATE GLASS CO., Pittsburgh.

J. R. CHURCHILL, named chief of the Analytical Div., Research Laboratories of Aluminum Co. of America, New Kensington, Pa.

Increase

Cold Mill Production with . . . MESTA-THOMSON FLASH WELDERS



Mesta-Thomson Flash Welder installed in a Mesta High-Speed Continuous Pickling Line

MESTA MACHINE COMPANY

PITTSBURGH, PA.

Designers and Builders of Complete Steel Plants

on the assembly line

automotive news and opinions

First cancellation hits automobile tooling . . . Auto layoffs begin . . . Buick V-8 will have a new type combustion chamber

by Walter G. Patton

Engine Tooling Hit—The long anticipated showdown between civilian and defense tooling has arrived. There has been no public announcement but it is evident that at least one auto firm has already found it necessary to shelve some of its tooling for high compression engines. The auto producer will be asked to compensate the machine tool builder for work performed up to the present time. One auto firm is expected to pay a substantial amount to a supplier for work on machine tools which have now been set aside in favor of defense work.

Cutbacks and Layoffs—The automobile industry, which has won many battles with Washington planners during the postwar period, seems to be losing ground in the current struggle. Cutbacks in steel, copper and aluminum will reduce projected passenger car output during June-July-August by a third.

General Motors has scheduled a week's shutdown of its assembly plants during the latter part of July. Releases to Chrysler's vendors have been cut up to 30 pct, according to the trade, and the company has announced a layoff of 20,000 workers. GM cutbacks are expected to be extensive. Ford has already had several brief shutdowns.

Will Leave Job Gap—There is little hope here that defense will be able to pick up the slack in auto employment. The volume of defense business is climbing rapidly. Defense tooling programs are making progress. The tonnage of critical materials being devoted to defense is increasing daily. Nevertheless, no one expects defense production to fill the gap left by reduced auto output.

A Better Buick Chamber—When it is introduced, the new Buick V-8 high compression engine will have a combustion chamber that is unique in the automobile industry. The new burning area will not be a hemisphere. It will require machining to proper accuracy. The new combustion chamber design has been intensively studied over a period of years.

Better Than '50—So Far—By all comparative standards, the automakers did very well during the first half of 1951. The industry has already produced 3 million cars. *Automotive News* estimates truck production during the first 6 months will reach 785,000 units. This is slightly more assemblies than were reported during the first half of 1950.

The raw statistics hardly tell the story, however. Early in May the industry was 200,000 units ahead of 1950. By the end of June, passenger car schedules had dropped to a level nearly 30 pct behind the industry's total a year ago. Outlook for the present is decidedly uncertain. While authorized to build 1,200,000 passenger cars, most automobile executives are inclined to believe the industry will never find sufficient materials to reach this goal.

Expect No Change—The present feeling among automobile people about the recent Korean peace feeler is that such a move will make little if any difference in automotive plans. The defense program is expected to go ahead. Competent observers see no immediate indication of a change in government policy unless forced by an aroused public opinion. The industry sees no change in the tough steel situation.

Can't Hit NPA Schedule—Indications are that NPA will allot materials for 275,000 civilian trucks, including 150,000 light units, 90,000 medium trucks and 35,000 heavy duty vehicles. Manufacturers may use their current inventories to boost production above this level. However, last week the alloy shortage had reached a point where few car and truck producers saw even the possibility of reaching the schedules set by NPA.

Turn Page

assembly line

Continued

Give $65,000 in Contest—A total of 734 awards aggregating $65,000 will be given to prize winners of the 1951 model car competition sponsored by the Fisher Body Craftman's Guild. Fourteen award winners will be selected by the Fisher judges for each state and the District of Columbia. These are divided between junior and senior divisions. State winners compete by regions. Forty regional winners receive expense-free trips to the Guild convention held in Detroit late in August.

No public announcement is made of the number of entries in the competition. The number of car models reaching Detroit this year will probably exceed 15,000. Various youth organizations throughout the country, including numerous Boys' Clubs and other youth organizations, are sponsoring the Fisher Guild program locally each year.

Kaiser Defense Work—A wholly-owned subsidiary, Kaiser Mfg. Corp., will perform K-F's defense contracts including the Fairchild C-119 cargo transportation plane, Wright R-1300-1 aircraft engine and component parts for the Lockheed bomber now being built at K-F aircraft division at Oakland, Calif. The new $25 million K-F defense loan was made by a group of banks headed by the Bank of America. Other banks in the group are the Mellon National Bank and Trust Co., Pittsburgh, and Bankers Trust Co., New York.

K-F will also build C-123 assault transport aircraft at Willow Run for the Chase Aircraft Co., Inc. The company is now employing about 1500 persons on aircraft work. The first "flying boxcar" is expected to be built this fall. K-F will use about two-thirds of the Willow Run plant for the production of automobiles.

Powder Uses Zoom—Applications for powdered metal products continue to grow. A recent addition is a door lock rotor. This was formerly made on a screw machine using a special steel section. Other new applications for powdered metal include a striker wedge for a door (formerly a casting), car seat rollers and bushings. Powdered metals are also being used extensively for defense. Included on a list of growing applications are rotating bands and shell fuses.

Buick's Schenck Retires—Robert Schenck, chief metallurgist at Buick, retired last week after 36 years of service. He was one of the first metallurgical engineers in the automobile industry to become actively interested in boron steel. His studies of boron-treated steel began prior to 1941. Schenck served as supervisor of research at Buick for the National Research Council during World War II.

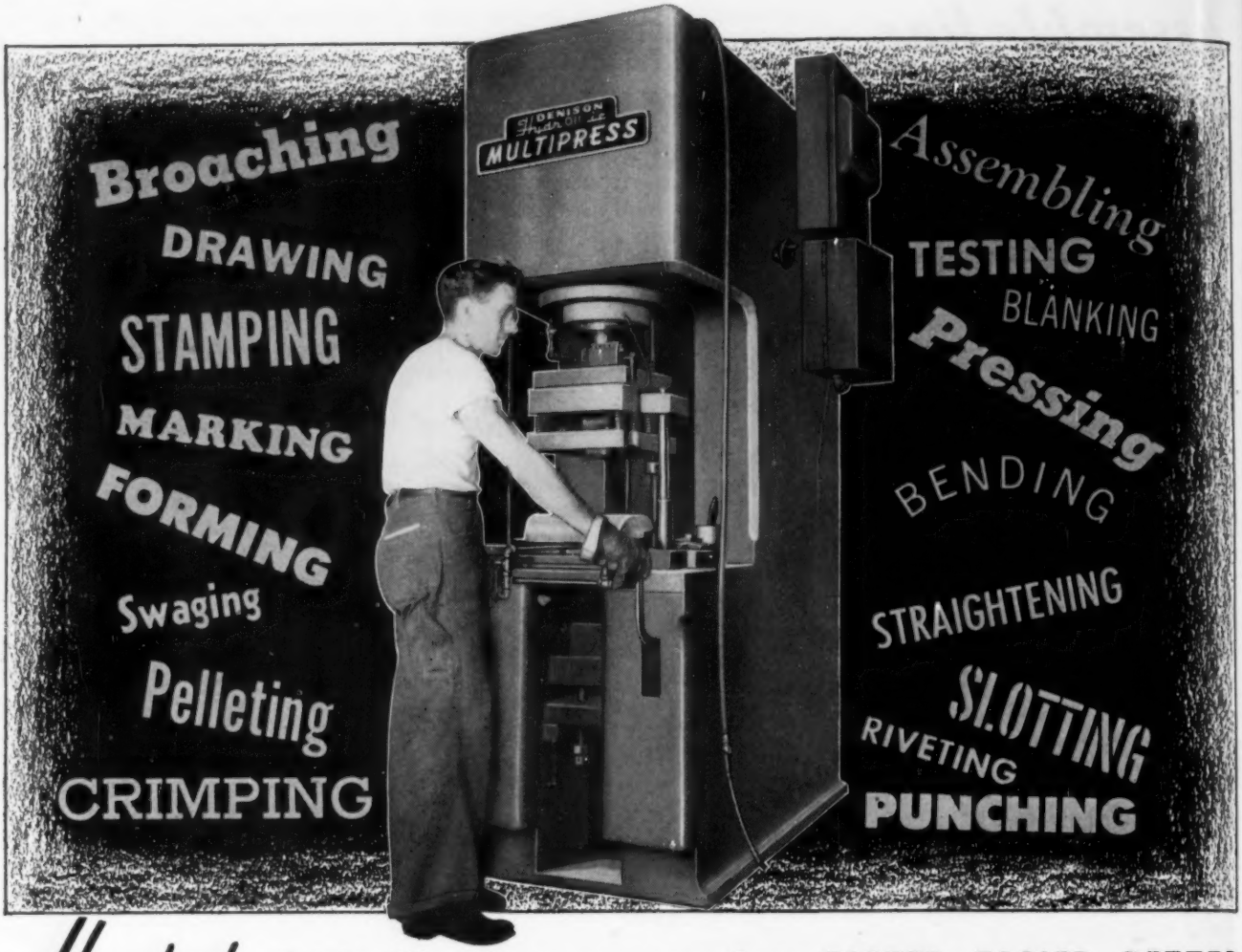
The retiring Buick metallurgist also worked on steel cartridge cases and developed several new methods of making armor plate and armor piercing shot. Buick's extensive experience with steels containing a minimum of critical materials will be helpful as the industry moves ahead into a critical alloy shortage. Informed sources close to the industry feel the tightest bottleneck during 1951 will be alloy steel, despite extensive switches to boron-containing steels. Bar steel of all kinds, however, is critically short. Many large forging companies are requiring assistance from their automotive customers.

Now, Rambler Hardtop—Nash has joined the strong industry trend toward the so-called hardtop convertible. The new 1951 Nash Rambler "Country Club" hardtop was introduced last week.

The new model has the popular Rambler body lines and provides both increased visibility and open air advantages of the conventional convertible. It will be sold at a price which includes about $300 worth of accessories including heater, radio, special upholstery, directional signals, courtesy lights and other deluxe features. Storage capacity in the rear of the Country Club model is 14½ cu ft. The car has a curved three-section rear window of 5½ sq ft.

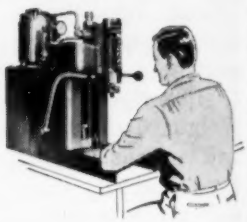
THE BULL OF THE WOODS — **By J. R. Williams**

WHAT A MOB IT TAKES UP HERE IN THE OFFICE TO KEEP THAT LITTLE SHOP FORCE OF MINE GOIN'! WHAT AN OVERHEAD!
TH' REMARKABLE THING IS HOW FEW WE HAVE UP HERE TO KEEP THAT AWFUL MOB OF YOURS GOING!
THEM TOP ROOSTERS LET ON LIKE IT'S ALL JOKIN', BUT I THINK THEY MEAN IT OR THEY'D NEVER THINK OF IT!
THAT'S CALLED RAZZBERRIES -- IT HAS SEEDS!
7-6
J.R.WILLIAMS
THE DIGNIFIED CUTUPS
T. M. REG. U. S. PAT. OFF. COPR. 1951 BY NEA SERVICE, INC.

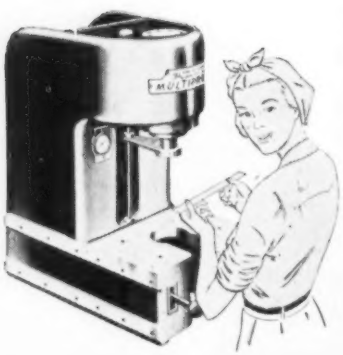


Hundreds of jobs like these are now done *FASTER, EASIER, BETTER*

with MULTIPRESS®



. . . the amazingly versatile tool for precision press operations



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Here are some of the reasons why you can expect Multipress to bring you advantages such as higher production, better work, less spoilage, lower tool and die costs, safer operation—*and happier operators.*

In addition to fast, smooth, efficient oil-hydraulic power, Multipress provides full, trigger-quick control of ram action at all times—with dual safety controls if desired. Ram speed, pressure, and stroke length are quickly adjustable to changing needs. Ram return can be set for either distance or pressure limits. Exclusive *Vibratory* ram action is available where production presents problems of air-escapement from dies, metal strain, uniform compaction or similar factors.

In addition, there's a wide choice of standard Multipress accessories for extra speed on many types of work—Index Tables, Dial Feed Tables, a Harmonic Stock Feed for continuous production from metal strip, pelleting attachments, straightening fixtures, foil marking equipment, and many others.

Multipress gives you a choice of eight frame sizes and pressure capacities from one ton through 50 tons . . . footpedal, handlever, pushbutton or automatic cycling controls . . . ram action for almost any operating need or sequence. Denison also is equipped to design and build dies and tooling to meet your specifications or requirements.

Write for the complete Multipress story!

DENISON *HydrOILics*

The DENISON Engineering Co., 1158 Dublin Rd., Columbus 16, Ohio

west coast progress report

digest of far west industrial activity

by R.T.Reinhardt

Southern Idaho on Display—Potatoes and wheat aren't the only products of Idaho bringing wealth and prosperity to its 600,000 citizens.

Late last month San Francisco financiers, as guests of the Idaho Power Co., Morrison-Knudsen Co., Inc., Westvaco Chemical Div. of Food Machinery and Chemical Corp., and J. R. Simplot Co., were shown the industrialization underway in the southern part of the state. San Francisco Stock Exchange sponsored the 3-day trip.

Completion by 1952 — Idaho Power has a $98 million power construction program underway to be completed in 1952. Five hydroelectric plants have been completed since the end of the war and this new power has attracted such industries as tungsten and cobalt recovery plants, and Atomic Energy Commission's reactor testing station, as well as Westvaco's phosphorous and Simplot's phosphate fertilizer works.

There has never been a power shortage in Idaho, but the company is ready to put in additional dams and power houses at nine other sites which could develop 965,000 additional kw if demand arises.

Construction Hub—H. W. Morrison, president of Morrison-Knudsen with headquarters in Boise, reported a backlog of construction contracts throughout the world totaling between $400 and $500 million. Among these are pipelines, dams and foundation work for steel plants.

Northwest Closes Mill—Northwest Steel Rolling Mills of Seattle closed its mill last week to give employees regular vacations and to permit the electric furnaces to build up ingot inventories. Poor grades of scrap continue to reduce production.

Freight Car Shortage Relief—A 6-day work-week has been advocated as a practical and quick way of relieving the freight car shortage which the steel industry fears. F. P. Whitman, president of the Western Pacific Railroad, recently stated that the 5-day week utilizes only 71 pct of the days of the week and 27 pct of the hours of a week. "If shippers were to load or unload just one more day per week, 130,000 cars could be released for service," he stated. He added that this number is just about the quota scheduled for construction during the emergency when steel is scarce.

The company recently purchased and is developing a 300-acre industrial tract in Santa Clara County, Calif., which will be offered for sale in parcels fully equipped with transportation and fuel facilities.

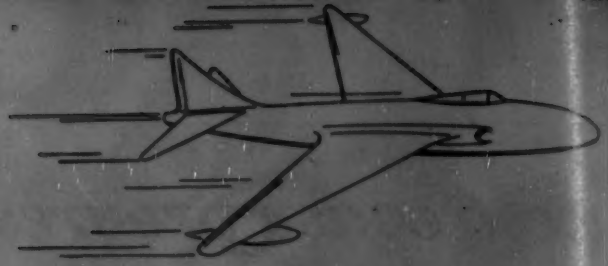
Airframe Manufacturers Boom—While many western metalworking plants complain of the delay in getting into government work, airframe producers can't join the chorus.

Boeing at Seattle is expected to soon start an expansion program of unannounced scope, but understood to be large; and Northrop Aircraft, Inc., in cooperation with the Air Force, will enlarge facilities at Hawthorne, Calif., by 30 pct at a cost of about $5 million.

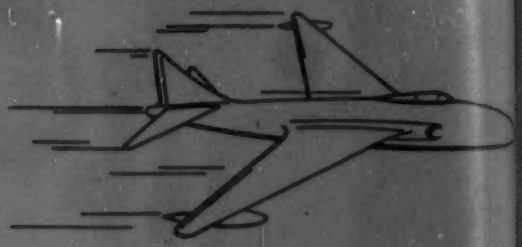
Ryan Aeronautical Co. has received a multi-million dollar contract for refueling pods for Boeing tankers to be made at San Diego; Rohr Aircraft Corp. reports a $75 million backlog—about six times as large as before the Korean war.

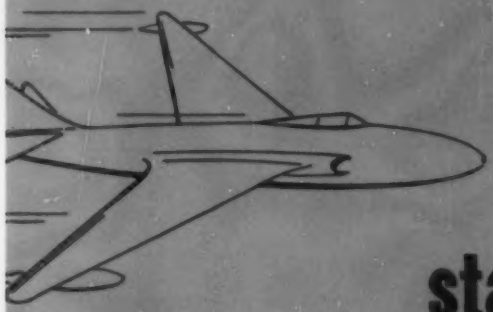
Direct Smelting Tried—Direct smelting of nickel alloys from iron-nickel ore, found near Riddle, Ore., and high-phosphorous iron ore occurring near Scappoose, Ore., is being worked on by the Bureau of Mines at Albany, Ore. Montana chromites may also be experimented with.

A 100 kw furnace specially designed to duplicate full industrial operations will serve as a pilot and a 500 kw furnace will be used to prove up these runs for commercial purposes. Both were designed by R. T. C. Rasmussen, chief of the ferrous metals branch at Albany, on experience gained by his observations of Japanese electric pig iron production.



extra stamina for supersonic speeds...





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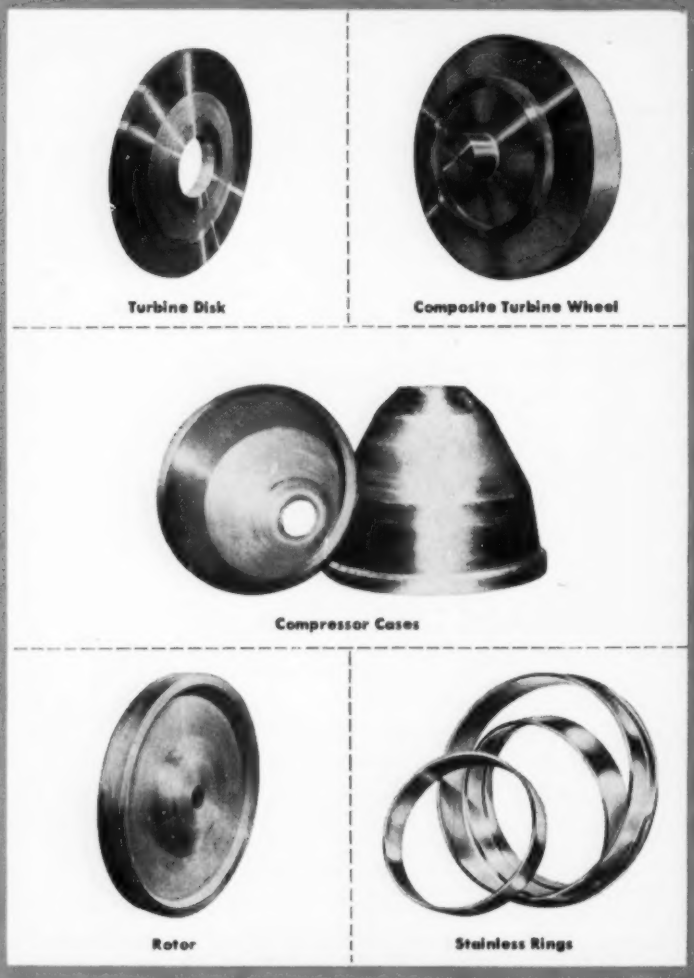

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the federal view

this week in washington

by George H. Baker

Fleischmann's Two Hats—Merger of DPA with NPA is resulting in elimination of duplicate defense planning, but not in fewer employees on the payroll.

Mobilizer Wilson had taken the position DPA was his planning agency (how much shall the military get?), while NPA was an operating (fixing allocations) agency. But Commerce Secretary Charles Sawyer went to bat for NPA, and finally convinced Wilson that efficient programming required absorption by NPA of DPA planning functions.

Theoretically, DPA is to retain its separate identity. But Sawyer has unofficially made it clear to Wilson that he expects to have complete control (through Manly Fleischmann, as head of both NPA and DPA) over industrial materials requirements.

Free Steel Drying Up—Demise of the ill-fated open-end CMP appears all the nearer this week, with the release of NPA's official steel supply outlook covering the third quarter. This confirmed what has been maintained all along—that under the proposed open-end control, the supply of free-market steel would shrink to 25 pct or less of total production.

Latest estimate by NPA is that there will be about 3,380,000 tons of steel left over from third-quarter allocations to be divided among users who are not eligible for CMP or other priorities and ratings.

This figures out to roughly 16 pct, a far cry from government estimates of a few weeks past, which estimated the take by defense and supporting production at only "slightly more than 50 pct."

Supporting Needs Expand—NPA's official estimate is that third-quarter ingot production will amount to about 27.5 million tons, from which will be wrung some 20.8 tons of finished steel. This, of course, is forecast on the basis of present production rates, and does not allow for development of scrap shortages and other delaying factors.

Out of this production, direct military requirements as approved for the Defense Dept. call for some 1,760,000 tons. Another 15,660,000 tons will be directly allocated for defense supporting production—including atomic energy, freight cars, coke-ovens, trucks, rated construction, and exports.

New Team Fights Dispersal—Unusual political coalition of Republicans and Northern Democrats is out to beat a proposal to decentralize defense industry.

Spokesmen for the combination say the plan sponsored by Senator O'Mahoney, D., Wyo., and Rep. Rains, D., Ala., would impair the defense program and would wreak havoc with the entire industrial economy of the North.

O'Mahoney and Rains would limit federal funds for defense plants to areas far removed from existing industrial concentrations and which have labor surpluses.

Contract Values Back in News—Munitions Board is agreeing somewhat reluctantly to resume publication of defense contract values. Earlier, military procurement officials ruled out the publication of dollar volume of contracts, claiming that violation of security was involved.

But opponents pointed out that nobody's hand was tipped by release of value estimates, since a $1 million contract for widgets might mean procurement of only one experimental widget of assembly-line production of 1,000,000 widgets.

Banks Spurring Defense—Federal Reserve Board's fight against inflation is beginning to result in the anticipated reduction in overall loan volume, but bank loans to defense and defense-supporting industries still are growing in volume.

For example, such loans gained by $67 million in the week ending June 13. Nodefense loans increased by $20 million. Decreases were reported in loans to commodities dealers, sales finance firms, and good processors.

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THE IRON AGE
FOUNDED 1855
TECHNICAL ARTICLES

Boron steels

a new era in alloy metallurgy

By D. J. Brown
Technical Editor

Many metallurgists believe we are entering a new era; that boron steels are in reality the first chapter of real alloy conservation which has been forced on us because we are poor in the required raw materials. Many of our former alloys were so rich in alloy as to be foolproof—anyone could heat treat them and get good results—but the crutch has been snatched away.

We can no longer put off the inevitable. The 4340, 3310, 4820 and other heavily alloyed steels are out—maybe for years—for anything but the most critical applications. From now on, better techniques, better equipment and better design are mandatory. This series will present the latest information on boron steels, what they will do, what they won't do and how they are being applied.

Part I. Background of boron steels . . . Recommended alternates for standard grades . . . Advantages and limitations of the new steels.

Critical shortages of chromium, nickel, molybdenum; columbium, tungsten and other alloys mean that boron steels must carry more of the impact of war on both our civilian and defense production. (THE IRON AGE, June 21, p. 107).

Fortunately domestic supplies of borax are plentiful. Even more significant is the fact that the new steels were developed, melted, fabricated into parts and tested in less than a third the time it took us to develop the National Emergency Steels of War II. The boron steel alternates for higher alloyed grades are based on equivalent hardenability. In some cases heat treating and carburizing practices must be modified to get optimum properties but on the whole most of these steels behave like the ones they replace.

Boron steels are not new. It is estimated that about 2 million tons have been used since the first commercial heat for actual application was melted in the late 1930's. The original idea of using small amounts of boron to increase hardenability was conceived in the mid-twenties.[1] Today this element is a full-fledged alloying agent. It is much more potent hardenability-wise than the hard-to-get nickel, chromium and molybdenum, long used in alloy steels.

Manganese is also a hardener and boron can be used to replace part of the manganese in the standard high manganese grades. However, it is believed that 0.60 Mn minimum will be necessary in all boron steels, so that the biggest saving in strategic alloys through the use of boron will concern chromium, nickel and molybdenum.

Some of the early claims made for the effect of boron in steel didn't help in its acceptance. Like many new developments, certain conclusions about boron were made prematurely. Thus boron has had all the extra hurdles encountered by child prodigies shoved in its path. It isn't good for everything, it's not a panacea, it must be used judiciously; but properly employed, *boron is today the only bright part of an otherwise very dark and difficult alloy picture.*

A little bit of boron goes a long way. In fact, boron will replace several hundred times its own weight compared to other alloys such as chromium and molybdenum on a hardenability basis. For instance, at the 0.40 C level 0.002 pct B is equivalent to 0.30 Mn or 0.35 Mo or 0.50 Cr or 2.00 Ni.[2] With less than half the required nickel and molybdenum available for the coming limited defense effort requirements, more alloy steel parts must of necessity be shifted to leaner alloys, boron treated; or just plain carbon boron

TABLE I

NEW AISI BORON STEELS

Grade	C	Mn	Si	Ni	Cr	Mo
			80 Bxx Chemical Composition Limits, pct			
TS 80B15	0.12/0.18	0.60/0.90	0.20/0.35	0.20/0.40	0.15/0.35	0.08/0.15
TS 80B17	0.14/0.20	0.60/0.90	0.20/0.35	0.20/0.40	0.15/0.35	0.08/0.15
80B20	0.17/0.23	0.60/0.90	0.20/0.35	0.20/0.40	0.15/0.35	0.08/0.15
80B25	0.21/0.28	0.60/0.90	0.20/0.35	0.20/0.40	0.15/0.35	0.08/0.15
80B30	0.27/0.34	0.55/0.80	0.20/0.35	0.20/0.40	0.15/0.35	0.08/0.15
80B35	0.32/0.39	0.65/0.95	0.20/0.35	0.20/0.40	0.15/0.35	0.08/0.15
80B40	0.37/0.45	0.70/1.00	0.20/0.35	0.20/0.40	0.15/0.35	0.08/0.15
80B45	0.42/0.50	0.70/1.00	0.20/0.35	0.20/0.40	0.15/0.35	0.08/0.15
80B50	0.47/0.55	0.70/1.00	0.20/0.35	0.20/0.40	0.25/0.50	0.08/0.15
80B55	0.50/0.60	0.70/1.00	0.20/0.35	0.20/0.40	0.30/0.55	0.08/0.15
80B60	0.55/0.65	0.70/1.00	0.20/0.35	0.20/0.40	0.30/0.55	0.08/0.15
			81 Bxx Chemical Composition Limits, pct			
81B35	0.32/0.39	0.70/1.00	0.20/0.35	0.20/0.40	0.30/0.55	0.08/0.15
81B40	0.37/0.45	0.70/1.00	0.20/0.35	0.20/0.40	0.30/0.55	0.08/0.15
81B45	0.42/0.50	0.70/1.00	0.20/0.35	0.20/0.40	0.30/0.55	0.08/0.15
81B50	0.47/0.55	0.75/1.05	0.20/0.35	0.20/0.40	0.35/0.60	0.08/0.15
			86 Bxx Chemical Composition Limits, pct			
TS 86B45*	0.43/0.48	0.75/1.00	0.20/0.35	0.40/0.70	0.55/0.75	0.08/0.15
			94 Bxx			
TS 94B17	0.15/0.20	0.75/1.00	0.20/0.35	0.30/0.60	0.30/0.50	0.08/0.15
TS 94B20	0.17/0.22	0.75/1.00	0.20/0.35	0.30/0.60	0.30/0.50	0.08/0.15

NOTE 1. These steels can be expected to have 0.0005 pct minimum boron content.
NOTE 2. The phosphorus and sulphur limitations for each steelmaking process are as follows:
Basic electric furnace—0.025 maximum pct.
Basic openhearth —0.04 maximum pct.
Acid electric furnace —0.05 maximum pct.
Acid open hearth —0.05 maximum pct.
NOTE 3. Minimum silicon limit for acid openhearth or acid electric furnace alloy steel is 0.15 pct.
NOTE 4. Small quantities of copper are present in alloy steels which are not specified or required. This element is considered as incidental and may be present in an amount not exceeding 0.35 pct.
* The TS 86B45 grade is designed to have hardenability equivalent to 4340.

steel, if there is to be enough heat-treatable steel to go around.

Boron is not as versatile as the other alloys which, in addition to being steel hardeners, promote corrosion resistance, wear resistance or better high-temperature properties. All boron does is increase the depth to which a steel can be hardened. This characteristic—called hardenability—is achieved by heat treating, usually by quench and draw methods. Boron does not change the actual hardness itself, as hardness is a function of carbon content.

The boron steels of today do have some advantages over former standard alloys. In addition to promoting alloy conservation, boron steels machine better, they have better hot and cold working characteristics, and shorter annealing cycles are possible in most boron analyses.

The NE steels forced on us of necessity in War II taught the American metallurgists plenty about hardenability and alloy conservation. Six of the NE steels stuck, were adopted as standard grades and used in large tonnages right up to the present; although heavy production was confined to only three of these grades, the 8600, 8700 and 9300 series.

Today we can't even afford the NE alloys of War II lean as they are in alloy compared to the former grades. All the 1951 metallurgist has available to make the constructional alloys for gears, axles, pinions, bolts, other heat treated applications and possibly some types of bearings is the residual alloy content obtained from scrap, a little manganese and chromium—*and boron.*

TABLE II

CARBURIZING ALTERNATES

Present AISI Grade	Present Hardenability Experience Limits Rc at 5/16 in.	Proposed Grade	Hardenability Rc at 5/16 in.
1320	20 to 44	80B20	25 to 40
2515	24 to 43	80B20	25 to 40
3120	22 to 40	80B20	25 to 40
4023	.....	8023	.....
4027	.....	8027	.....
4028	.....	8028	.....
TS4118	20 to 40	80B20	25 to 40
4320	27 to 42	94B17	27 min
4620	19 to 39	80B20	25 to 40
TS4720	20 min	80B20	25 to 40
4820	27 to 47	94B17	27 min
5120	19 to 33	80B20	25 to 40
6120	25 min	80B20	25 to 40
8620	19 to 41	80B20	25 to 40
8720	23 to 42	80B20	25 to 40

TABLE III

0.40C ALTERNATES

Present AISI Grade	Present Hardenability Experience Limits, Rc Min.			Proposed Grade	Hardenability Proposed Grade, Rc Min.		
	5/16 in.	8/16 in.	12/16 in.		5/16 in.	8/16 in.	12/16 in.
1340	34	27	...	80B40	46	31	...
3140	42	36	20	81B40	49	45	32
4047	30	27	...	80B40	46	31	...
4140	42	37	31	81B40	49	45	32
4340	49	47	42	86B45	55	53	48
4640	39	33	...	80B40	46	31	...
5140	35	31	...	80B40	46	31	...
8640	38	33	...	80B40	46	31	...
8740	38	33	...	80B40	46	31	...
9440	38	33	...	80B40	46	31	...

The result has been that since January of this year 62 new alloy grades in 7 types, 4 boron and 3 non-boron steels have been developed which, through the ingenuity of our metallurgical engineers, may see us through. Many of these steels are triple alloys in which the chromium, nickel and molybdenum contents have been pared to the bone. They are being turned out in production heats and are in use. About 5 new grades will soon be added, 2 of the boron type and 3 more lean alloy, non-boron type. Shops which never heard of boron steels or resisted their use will have to take it or else.

Korea triggered development

About the time of Korea, the American Iron and Steel Institute and the Society of Automotive Engineers realized they had to get ready for any eventuality. This group knew we would have to develop leaner alloy steels for non-military uses than we had during War II, for two major reasons: (1) We are poorer in available alloys today; (2) present military uses require much richer alloys. It even appears now that the military will have to depend to a large extent on the leaner alloys, particularly if the cold war gets hotter.

To develop the lean alloy boron steels a joint committee was formed of the top metallurgists of the steel producers, automotive and farm implement makers. This committee is known as the SAE, Iron and Steel Technical Committee Div. VIII, is under the chairmanship of H. B. Knowlton, supervisor, materials engineering, International Harvester Co., Chicago.

In March the AISI through its Alloy Steel Committee headed by Porter R. Wray, U. S. Steel Co., announced the new steels. These steels, listed in Table I, are the result of all our experiences with the leaner alloys of the last war plus the peacetime use of boron grades. Some of them are fully tested. Others are in the process of being proved. So far they have lived up to expectation and many such types will later come into use.

Boron has proved very effective in both carburizing and medium carbon grades. The high nickel carburizing types, 3300, 2500, 4800 and 4600, long used in automotive gears and pinions and shafts, are being replaced by 43B17, 94B17, 94B20, 81B20, 80B20 and 50B20. Table II lists most of the standard AISI carburizing grades and shows the proposed boron steel alternates.

Boron spring steels are in use

In Table III the proposed alternates for some standard alloy grades of the 0.40 C type are shown. These higher carbon steels are being tested for bolts, steering knuckles, axles, crankshafts, and similar heat treated parts. Boron spring steels, 0.60C, are also under test and so far have out performed some the old spring steel types. Detailed reports on these applications will appear in later parts of this series of articles.

It is generally held that the effect of boron on

increasing hardenability decreases as the carbon increases, see Fig. 1.[3] A multiplying factor, Fig. 2, for the effect of boron permits calculated hardenability for any given carbon level.[3] This formula proved very accurate and helpful in some of the work in developing the new boron steels.

It is estimated in some quarters that about 2 million tons of boron steels, excluding armor may be produced this year. By the end of the year 70 pct to 80 pct of construction alloy production based on 1950 tonnages may be boron grades. Next year it is expected that the boron steel tonnage will greatly increase. Tonnages as high as 20 million tons have been mentioned.

The steel mills have worked out melting procedures for boron on many boron additive agents. The popular boron agents are listed in Table IV. All these agents are added in the ladle and pounds per ton added vary from shop to shop and from one steel type to another. However, the usual weight of boron ferroalloy added per ton to reach the minimum boron content required is well established. These amounts are shown in the righthand column of Table IV. Usually 50 pct more boron ferroalloy per ton is required in electric furnace heats than for the same steel made in the openhearth.

Many ferroalloys can be used

Although some steel producers and users have certain preferences about the type of boron ferroalloy, all of these agents, when properly added, accomplish the major goal of increased hardenability.[4, 5] Usually the users leave this choice up to the mills. Lately some users have specified boron steels, 94BV17 or 43BV14, which requires the mill to use a vanadium-bearing ferroalloy such as Grainal No. 1. (See box, top left, p. 84.)

The proposal that boron be used to replace some of the manganese content of alloy steels has no place in today's picture. If this were done, there would not be enough boron to go around. The ferroalloy producers may be pushed to supply the quantities of boron needed to replace nickel, chromium and molybdenum, but it appears they will be able to meet all boron requirements to make the present types of boron steels. The supply of boron is unlimited. We have deserts full of borax but the electric furnace facilities to make the boron ferroalloys are limited. Electric power shortages are really the only bottleneck which might limit the production of the boron ferroalloys.

Before citing the wartime, postwar and cold war applications and pertinent properties of boron steels, some of the limitations or facts of life on this alloying agent should be understood. While it is firmly believed that the use of boron steels offers the greatest method at hand of

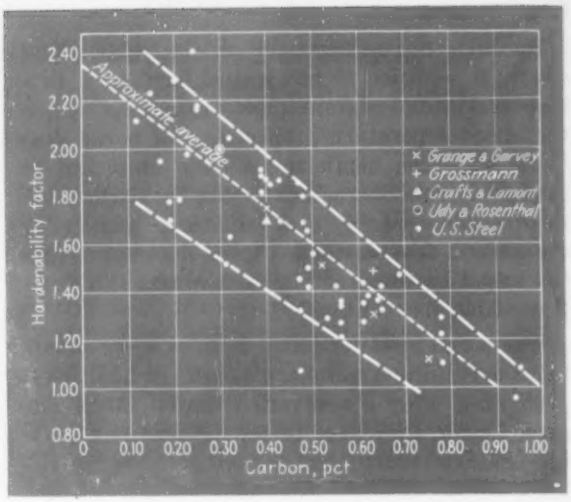

FIG. 1—Effect of carbon content on the hardenability factor of boron. This is based on ideal critical diameters derived from 50 pct martensite critical hardness.[3]

TABLE IV

BORON FERROALLOYS

Trade Name	Manufacturer	Chemical Composition, pct								Addn Openhearth
		B	Si	Al	Ti	Mn	Zr	Ca	V	
Ferro-Boron*	Electro Metallurgical Div., Union Carbide & Carbon Corp.	17.50	1.50	0.50	.....	.....	.....	.....	.....	0.5 lb per ton
Ferro-Boron*	Molybdenum Corp.	12.00	4.00	.....	.....	.....	.....	.....	...	0.8 lb per ton
Borosil	Ohio Ferro-Alloys Corp.	3.0	40.00	.....	.....	.....	.....	.....	.....	2 lb per ton
		4.0	45.00							
Grainal #79	Vanadium Corp.	0.50	5.00	13.00	20.00	8.00	4.00	.....	.....	4 lb per ton
Silcaz	Electro Metallurgical Div., Union Carbide & Carbon Corp.	0.55	35.00	6.00	9.00	.....	3.00	9.00	.....	4 lb per ton
		0.75	40.00	8.00	11.00		5.00	11.00		
Grainal #1	Vanadium Corp.	0.20	3.00	10.00	15.00	.....	.....	.....	25.00	4 lb per ton
Silcaz	Electro Metallurgical Div., Union Carbide & Carbon Corp.	0.55	35.00	5.00	9.00	.....	5.00	.....	9.00	4 lb per ton
		0.75	40.00	7.00	11.00		7.00		11.00	

* More aluminum per ton is needed in the ladle than usual, particularly in lower carbon heats.

$$Fb = 1 + 1.5\ (0.90 - C)$$

Fb = multiplying factor
C = proposed C content

FIG. 2—Formula for calculating boron effect.[3]

TABLE V

CRITICAL TEMPERATURES, °F

Grade	Ar_1	Ae_3	Ms (cal.)
4317	1270	1485	740
43B17	1270	1485	740
4615	1250	1465	775
46B15	1250	1470	770
8620	1320	1505	760
86B20	1320	1530	765

alloy conservation, some parts of this program are still in the experimental stage.

The general limitations outlined are well established. There are other characteristics of boron less important but worthy of note. Boron changes the critical temperatures of steels only slightly. Table V compares these temperatures of a few of the alloy grades.[2] Usually boron steels are tempered at somewhat lower temperatures than the grades for which they serve as suitable alternates. The proper tempering temperature of 10B45 is 100° to 150° F lower than 9440 to get the identical tempered hardness.[6, 7] To match the same tempered hardness of 4145, 13B45 must be tempered at 150° to 200° F lower.[3]

One of the unique effects of boron on hardenability is that it delays the start of austenite transformation appreciably while delaying the completion of transformation only slightly.[3] Isothermal transformation diagrams showing this phenomenon in the 8620 grade are shown in Fig. 3.[5]

Some of the troubles occasionally experienced in the early use of boron steels have been overcome. The tendency of grain coarsening of ferroboron treated steels has been licked by using more aluminum in the ladle. At times in the past the last few ingots of a heat showed a lower hardenability. This fading seldom, if ever, occurs today. Experience so far with some of the new boron carburizing grades indicates these steels produce more distortion in a heat treated part than did the old grades. However, it ap-

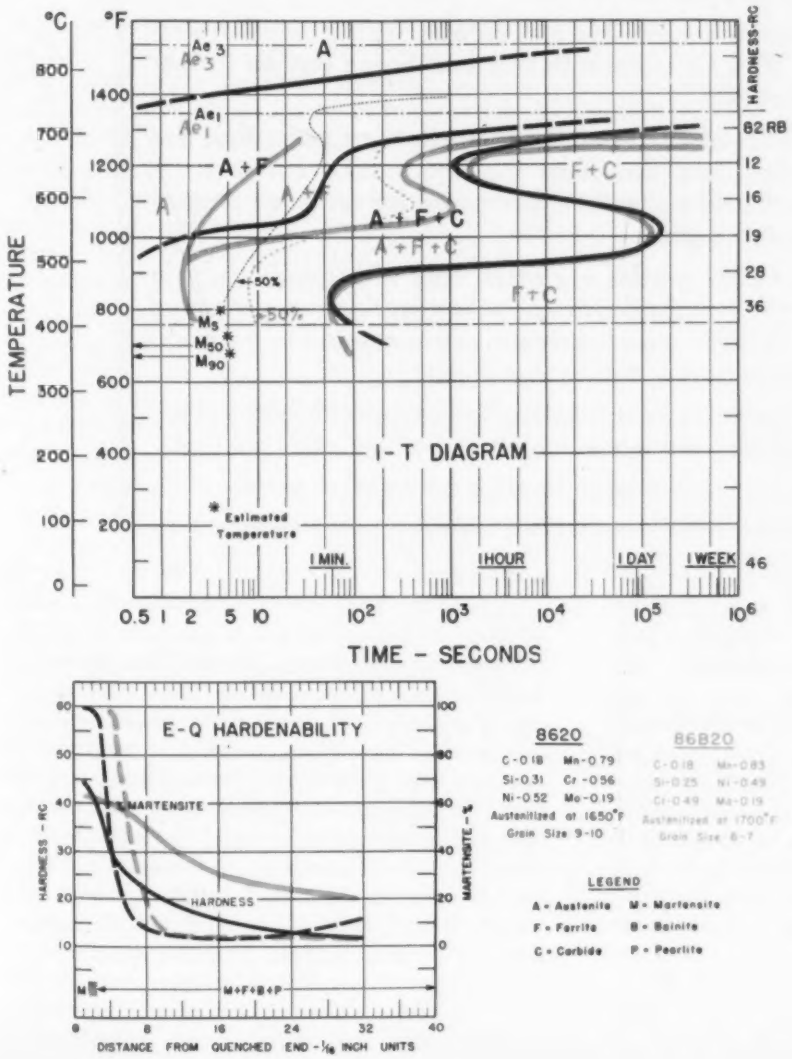

FIG. 3—Effect of boron on the isothermal transformation diagram of 8620. Start of transformation is delayed appreciably while completion is delayed only slightly. Courtesy U. S. Steel Co.

Boron Steel Less Expensive

Usually the AISI boron steel alternates for any given grade costs less per ton. One exception is the "BV" type. Some users are specifying an analysis of from 0.03 to 0.09 V in carburizing types. In such cases the customer is charged for this vanadium content in these boron grades which make the price about equal to some of the former grades.

pears that the distortion is more consistent in the new grades and in the long run may be easier to handle. More specific information on precise parts will be cited later. Very recently the manganese contents of a few of the new grades have been raised. This change was made to offset the loss in hardenability caused by using lower carbon to combat distortion of heat treated parts.

The actual reporting of boron content in a heat of steel is not the same as with the other elements because the hardenability effect is obtained over a rather wide range of boron content as long as the minimum boron content is present. Also the minute quantities, 0.0005 pct minimum, plus the difficulties of wet chemistry methods make usual methods for boron impractical. The end quench hardenability tests from each heat are usually all the customers have required. Although accurate chemical and spectrographic tests can be made for boron these tests show total boron content. The actual hardenability effect of boron depends on the amounts of soluble boron and insoluble boron in a steel so that a test which shows total boron content per se is not conclusive. For these reasons, it appears that the end quench test is by far the most suitable and most practical test that has been found to date. A metallographic test for boron in hypoeutectoid steels was developed in 1945.[9] A few users are using this test for information purposes only.

The first known use of boron steel was for experimental cockpit armor of airplanes in 1918. Boron was used to a limited extent during War II on various ordnance parts, armor, AP shot, and vehicle applications. Torsion bars for tanks produced by Cadillac and Buick were made from 92B62. One of the oldest applications of boron steels was for diesel crankshafts. These cranks, still being produced today, are made by Park Drop Forge Co., Cleveland, which employs a 50B46 steel, containing 0.20 to 0.35 Cr.

During the alloy shortage of War II Timken-Detroit Axle developed boron steels for truck axles known as Axalloy. These C-Mn steels performed very well. One of the factors which precluded wider use of the Axalloy grades was that the residual chromium, nickel and molybdenum contents kept increasing. A maximum alloy content was later added to Axalloy specifications to keep the hardenability down. When the residual alloys exceeded the maximum the axles hardened all the way through and failures might have occurred had such axles been put in service. Finally the use of these grades were discontinued because too many difficulties were experienced in keeping the residual alloys low enough.

There was no standardized industry-wide

Boron Steel Limitations

1. More boron content is needed in the lower carbon grades to obtain the maximum hardenability effect.
2. Too much boron may cause the steel to become hot short. In high carbon steels this maximum is about 0.005 pct B; in low carbon grades the maximum is 0.008 pct B.
3. Effect of boron on hardenability decreases with increasing carbon up to about 0.90 C. Above this carbon boron has no further effect on hardenability.
4. Maximum benefits of boron are only manifest on parts that are thoroughly quenched and drawn as the final heat treatment. A fully tempered martensitic structure is required for optimum properties in the heat treated part.
5. The former rich alloy grades are often used with good results in parts larger than the standard critical cooling section recommended for those grades. If high impact properties are needed in the core, it is not advisable to do this with boron steels.
6. More precise control in heat treating is required with boron steels than with those which were made foolproof by high alloy content.
7. More distortion is likely in heat treating boron steel parts.

H. B. Knowlton, supervisor, materials engineering, International Harvester Co., chairman of ISTC Div. VIII, SAE on boron steels. The author wishes to thank the members of this committee for their help and cooperation and for the opportunity of attending their meetings. Thanks are also due Porter R. Wray, U. S. Steel Co., chairman of Alloy Steel Bar Committee, AISI, for his valuable help and guidance.

boron steel program during War II so that its use was usually a private affair between steelmaker and user. However, WPB and the War Metallurgy Committees did investigate the merits of boron and some definite programs were carried out.[4, 10, 11]

The first government action directed toward the wartime use of boron-treated steels took place in 1942. Following the request of the War Production Board for an investigation of the merits of "needled steels" in the interest of alloy conservation, two independent surveys were conducted for the purpose of collecting, assembling and interpreting all available data on steels of this type. One survey was directed by a subcommittee of the War Metallurgy Committee and the other by a joint committee consisting of representatives of steel manufacturers, special addition agent manufacturers and steel consumers.

13T45 is good alternate for WD4145

In January 1943, a new committee on needled steels was formed consisting of representatives of steel manufacturers, steel consumers and the Armed Services, and a testing program was initiated which later became known as Caterpillar Project.[12] Another program known as the Ordnance Project was instigated in July 1943.

The testing program for the Ordnance Project was planned and conducted under the direction of the Subcommittee on Special Addition Agent Steels of the SAE Iron and Steel Committee with the assistance of representatives of AISI, WPB, Army Ordnance, War Metallurgy Committee and others who participated.

As a result of these programs, some fundamental conclusions were reached and had the war lasted much longer, more boron steels would have been used. The conclusions of this work appear below;[4] at that time, the letter "T" was used to signify boron instead of the "B" designation now in use.

The seven commercial addition agents tested, when added in the more favorable amounts, were all substantially equally effective in improving the properties of the 0.45 C—1.50 Mn steel. This steel, so treated (13T45), was practically equivalent in hardenability (J-50) and mechanical properties to the SAE 4145 with the exception of the lower notched toughness of the former steel at relatively low hardness (Rc 40 or less), especially when tested at low temperatures.

The 13T45 steel proved suitable for army truck parts (torque rod end pin), specified to be made of WD 4145, with respect to both the quality of the finished part and the fabricating properties of the material. The 13T45 steel also proved equal, or superior to WD 8745 for M-1 rifle components under performance tests, and compared favorably with WD 8745 in fabricating properties.

Special laboratory tests were conducted on truck and tractor axle shafts and truck steering knuckles, comparing the 13T45 with SAE, WD and NE alloy steels, but the results were such that no definite conclusions could be drawn.

In fabricating properties, including forging, heat treating, cold drawing and machining, the 13T45 steel was substantially equivalent to the SAE 4145 and similar WD and NE steels, with the possible exception of machining.

Part II in this series will appear in next week's issue. Carburizing and heat treating practices on specific applications will be presented.

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Five-minute bath descales forgings

A pre-heat chemical bath has been developed which completely removes furnace scale during quenching of forgings, and has accounted for cost savings of 90 pct over previous methods used in industrial production. The bath is made up of a new product, Pennsalt SR-4, dissolved in muriatic acid and water.

Forging scale is an iron oxide which is harder than steel, is very abrasive, and clings tenaciously to the forgings. If not removed completely, it affects accuracy and promotes tool wear. If left on finisher parts, pieces of the scale may drop into mechanisms and wear working parts rapidly.

The bath requires no heating and is made up in ordinary rubber-lined tanks. Dipping baskets can be made of simple sheet iron. Parts covered with forging scale are immersed in the bath for 5 min and then may be placed directly into heat treating furnaces or stored for later heat treating.

Following the heating the forgings are water-quenched by emerging from the furnace directly into the quench tank. In conventional operations, the tenacious furnace scale is then removed by expensive sand or shot-blasting, but with the use of the SR-4 bath this process is completely eliminated in most operations. When the forgings treated with SR-4 are water-quenched, the scale actually blasts off from all surfaces, leaving them perfectly clean for subsequent machining.

Both laboratory tests and plant operations at Spicer Mfg. Div., Dana Corp., have shown that the SR-bath provides for complete removal of scale from carbon steel forgings, even from deep indentations and blind holes difficult to reach in sand- or shot-blasting. The bath also provides for efficient scale removal after heat treatment in most cases where oil quenches are used, and in such cases where scale removal is not complete, sand or shot-blasting operations can be reduced considerably.

Use of SR-4 in the Spicer operations has resulted in a 90 pct reduction in descaling costs and in the elimination of costly shot-blasting equipment and resulting delays due to downtime for maintenance of this equipment.

Satisfactory results have been obtained in SR-4 descaling of plain carbon steel grades and some SAE alloy steels. The Pennsylvania Salt Mfg. Co. is currently field-testing the product in other industrial plants in order to determine its effectiveness on other alloys.

DESCALING EFFECT is demonstrated by these three identical forgings. At left is forging as it comes from heat-treat. Center forging has been quenched, but still needs descaling. Forging at right was treated with SR-4 prior to heat treating. Quenching has removed all its scale.

By T. E. Imholz
Welding Engineer
Republic Aviation Corp.
Farmingdale, N. Y.

Aluminum tanks welded in unique fixtures

Unique fixtures facilitate arcwelding of aluminum aircraft wing tip gas tanks at Republic Aviation. Both hand and automatic Heliarc welding are employed, with and without filler rods.

Disposable fuel tanks, made for attachment to wing tips of F-84 E Thunderjet fighters, are important equipment because they permit long range flights not feasible otherwise.

Small tanks have been made with halves integrally flanged and held together by closely spaced bolts. But, when larger tanks were designed it was necessary to provide stiffened flanges because of the heavy stresses to which tanks may be subjected in service. The stiff flanges insure tight joints with fewer bolts than would be needed if integral flanges of relatively thin stock were used. These tanks are of streamlined shape with a shell of 61 SW aluminum sheet stock 0.057 in. thick. Overall length is 112 in., maximum diameter is 28½ in., and the tanks hold 230 gal of kerosene.

The flange extrusions have a T-shaped section, the flange proper being ½ in. thick and the vertical leg of the T being ⅛ in. thick near the flange and half this thickness at its outer portion. This leaves a step against which the edge of the shell wall fits. A Heliarc weld is made along the outer end of the leg. One flange has a flat joint face but the mating extrusion has a milled channel along its face to hold a gasket of circular cross-section.

Extrusions are of 61 ST aluminum alloy and are formed and drilled before assembly to fit the contour of the shell. At each end of the shell, the radii are too short to permit the extrusion to be bent to contour. At these points, forgings of 53S aluminum alloy are used, machined to proper contour and to the same section as that of the extrusions. The ends of the forging are welded to the ends of the extrusions.

Thus the assembled flanges form complete rings of streamline contour and T-shaped sec-

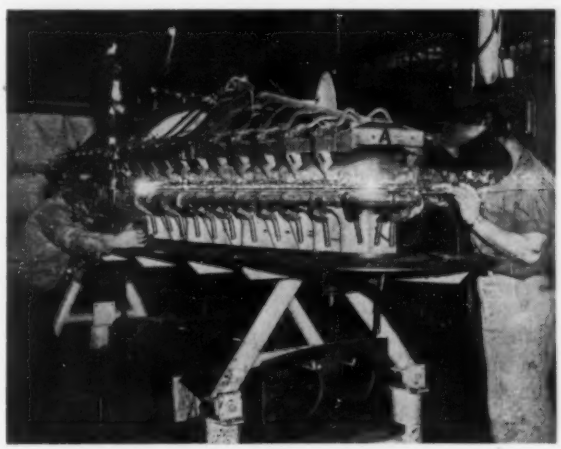


FIG. 1—Welding the flange on a Republic wing tip gas tank. Operator at right is welding the flange extrusion and flange forging butt joint. Operator at left follows the automatic carriage as it moves around the seam, continuously inspecting the weld and adjusting carriage speed and electrode position as necessary for weld uniformity.

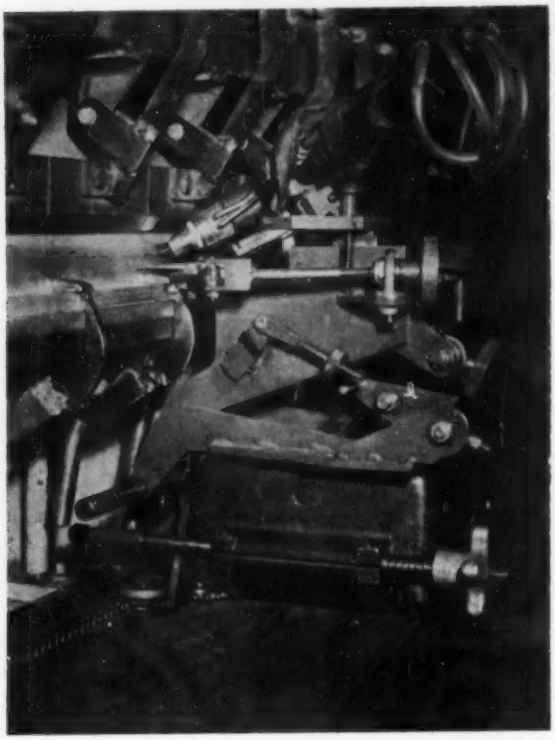


FIG. 2—Closeup of the automatic welding carriage, in operating position. Shelf runs entirely around fixture. Sprocket at bottom engages fixed roller chain to propel carriage. Above electrode are clamped copper backup segments to absorb heat.

tion. There are four Heliarc buttwelds in each complete flange. These welds are made by hand, using a 5 pct silicon aluminum filler rod, before the rings are welded to the shells. These buttwelds are made in the same fixture employed for welding the rings to the shells.

Each half shell has its own flange and the two mate in a vertical plane when assembled to the plane wings. Although the half shells have the same streamlined shape, they are not duplicates. The outboard half, being away from the wing, fits only the flange, while the inboard half has a well that must fit over the wing tip to which it is fastened. The well is a separately drawn stamping made to fit an opening in the inboard shell and is welded to the edge of the opening where the shell is flanged at its contour. When this Heliarc weld is made, the flange melts and supplies filler metal to form the weld bead.

Before the well is welded in place, it is spotwelded to a pair of preformed doubler plates whose extensions fit and rest against the inner wall of the half shell to which the extensions are subsequently spotwelded. Actually, the doubler plates take the whole load of the tank as they are fastened to wing tip fittings when applied to the wings. The doublers also reinforce the well that they support and transmit to the wing fastenings such stresses as the tanks impose in service.

Inboard and outboard shells fit together perfectly when assembled and, since they are made on an interchangeable basis, either half can be replaced in the field when a mating half is injured. The extremely stiff contour flanges of the two halves are so rigid that, with the gasket chosen, it is easy to obtain a tight joint with comparatively few bolts, even when field assembly is done.

Initial assembly of the inboard half is done in a fixture which includes a flat steel plate on which the flange components rest and along which the carriage for the welding torch is traversed.

Air clamps hold back-up bars

Besides the plate and its supports, the fixture includes hand-operated toggle clamps, for holding in correct relative position the parts to be welded, and air-hydraulic clamps for holding the copper backing segments firmly against the parts. Without these backings, satisfactory welds could not be made. Portions of the backing clamps are supported on a separate structure that is dropped over the shell by a hoist, after the shell and ring components are in place.

Before the flange components are welded to the shells, the four welds that join the ends of the two extrusions to the two forgings are made by hand. When this has been done, the automatic carriage for the torch that welds the shell to the flange is set on the shelf and is adjusted to make the long weld around the contour.

The torch is a standard water-cooled Linde Heliarc type. Tubes for water circulation and current leads are supported from overhead so as to keep free of the work and the fixture. A standard tungsten electrode of $\frac{1}{8}$-in. diam is used, held in a constant angular position relative to the shelf as the carriage is traversed around the work. Approximately 90 amp is used. The shielding gas is argon, fed at a rate of 10 to 12 litres per min. All joint surfaces are cleaned

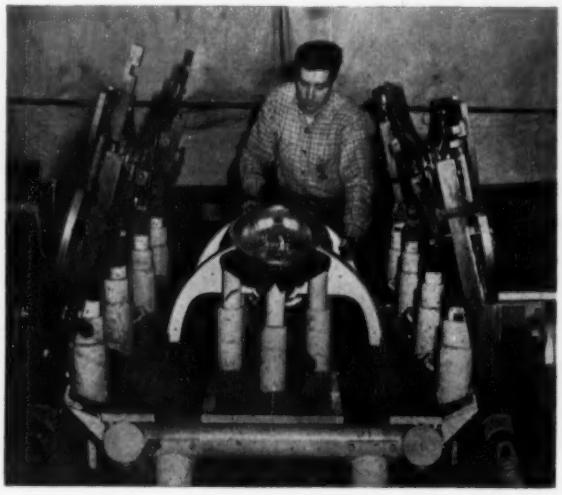


FIG. 3—Fixture for holding inboard tank half and well during welding. Fixture is in open position with well stamping in place.

with a stainless steel air-operated rotary wire brush before welding.

The torch electrode is guided by making the carriage follow a rail or track which has the same curvature as the weld contour. There are three spring loaded guide wheels on the carriage, so arranged that two roll along the outside of the rail and one inside, the rail being supported on the shelf along which the carriage is traversed.

Chain holds carriage speed constant

To make the carriage travel at a uniform speed, its driving motor is geared to a sprocket that turns in a horizontal plane. The sprocket meshes with a roller chain fastened to the guide rail directly below the weld. The chain follows the weld contour precisely, and insures constant carriage speed in relation to the weld. Speed is between 45 and 48 ipm. Arc length is held constant by a thin wheel that rolls against the outer face of the extrusion.

Operation is largely automatic, once the weld is started, but is subject to occasional slight hand adjustments as needed to produce a uniform bead. Metal for this bead comes largely from the extrusions and end forgings. Heat generated by the arc tends to spring the shell away from the mating flange elements but the rigid fixture prevents this. The copper clamping segments absorb most of the heat and radiate it quickly. Since the arc does not remain fixed but moves rapidly, there is only momentary heating at any one point.

Fixtures for the flange welds on each half of the tank are near duplicates except that the one for the inboard unit is made to fit the opening for the well. The welding setups and procedures on the two are identical, as far as the flange welds are concerned.

A third welding fixture is needed to hold the inboard shell and the well in correct relative position. In this case, the carriage nearly duplicates that already described and is traversed in the same way and at the same speed, but the weld is shorter and the torch position is altered. The fixture has two halves, hinged to facilitate loading and unloading. A center section is removable and held down by bolts when applied. Metal fused to form the bead comes from the edge of the flange. In this setup, the welding electrode is nearly vertical.

FIG. 4—Joining the well stamping to an inboard tank half. Automatic carriage operates in same manner as carriage shown in Fig. 2.

Spotwelding is confined to fastening doublers to the well before it is arcwelded to the inboard shell, and to the inboard shell after it is joined to the well. Similar spotwelding of stiffeners is done on the outboard half. This is done in 75-kw Sciaky machines with water-cooled electrodes. Parts are first cleaned by a 1½-min dip in a 10 to 12 pct solution of hot nitric acid and sodium sulfate. Individual welds are about ¼ in. diam. Each must have a shear strength of 950 lb.

Manipulator used for spotwelding

For welding the doubler extensions to the shell, it is necessary to provide special handling facilities and employ large curved arms in the welder. In one of these machines the lower arm, which is a heat-treated forging, had to be bent in a hydraulic press to bring the lower electrode into position for many of the spotwelds. A special upper arm extension is also needed.

Since the doublers are first spotwelded to the well stamping and are previously shaped to fit the inner surface of the inboard shell, little clamping is needed. It is necessary, however, to fasten to each end of the assembly a small fixture that has an extending trunnion by which the assembly can be supported and handled to bring the assembly into position for each weld. Each trunnion rests in a hole in a clip hung by cables from a carriage running along a track.

This track is supported by a pivoted and counterweighted linkage so that it can be raised and lowered easily. The track is also arranged to swing about a vertical pivot which is in line with the upper electrode but well above the welding machine. The carriage supporting the cable can run freely along the horizontal supporting track; thus the assembly can be shifted endwise and rocked about the supporting trunnions.

Two workmen, one at each end of the assembly, move it longitudinally, rock it about the trunnions, and raise and lower the whole unit to bring each spot where a weld is to be made between the electrodes. About 97 spotwelds per minute can be made.

With the tank under air pressure, all arcwelds are painted with a solution that produces bubbles where leaks, if any, exist. These are marked and are repaired by hand Heliarc welding, after which test the tanks are ready for final assembly.

By K. N. Mills
Mechanical Products Mgr.
International Derrick & Equipment Co.
Columbus, Ohio

How to approach SHELL FORGING PROBLEMS

The several forging methods used in the production of artillery shells all have certain limitations and pose a variety of problems. However, the solution to such problems as forging symmetry, cavity and surface defects and cracks, is fairly simple when approached with a careful analysis and the application of sound basic engineering principles.

THE initial phases in the production of forgings for artillery shells are usually accompanied by more than the normal number of production headaches. Due to the nature of this product, it is only produced during times of national emergency when the working force is being expanded with relatively inexperienced help. The many problems incident to this expansion, the mass production of a single type of forging and the exacting government specifications covering it all combine to place a heavy burden on forge shop management.

Defects cause premature bursts

Government specifications may be one of the largest causes for production losses. However, they are justified by the service requirements for the finished projectile and the reduction in machining costs achieved through these specifications. The cavity must be free of defects which might cause a premature explosion of the bursting charge.

Such premature explosions can be caused by fins, laps, cracks and other conditions that create excessive roughness in the cavity. If there are passages from the base of the shell to the cavity, the heat and pressure developed in the gun tube by the propellant charge may detonate the bursting charge, which could destroy the gun and the gun crew.

To assure an accurate, predictable flight pattern, the cavity must be round and concentric with the outer surfaces. While this requirement is not under the complete control of the forger, forging errors can have a material influence on accurate machining; the machinist cannot correct such errors as ovality of the cavity.

Machining cost is materially influenced by the accuracy of the forging. The amount of finish stock allowance required on the shell is determined by the allowance given the forger for eccentricity between the cavity and the outer surfaces. If the amount of eccentricity exceeds some critical value, two rough turn cuts will be required to finish the shell due to the increased depth of cut on the heavy side of the forging. This materially increases the cost by increasing total machining time and reducing tool life.

During World War II, shell forgings were produced by a variety of processes, each having certain advantages and limitations. The process best suited to one producer might prove least desirable to another whose forging experience was concentrated in a field using vastly different techniques. The majority of shell forgings were produced by one of the following four basic methods: (1) Pierce and draw; (2) pierce, roll and draw; (3) pierce—single pass; and (4) upset, pierce—multiple pass.

Close fit centers billet

In the pierce and draw method, the heated billet is first placed in the die and pierced to form the start of the cavity. The general arrangement of the die, punch guide ring and punch used in the operation is shown in Fig. 1. The billet is usually a round-cornered square with its across-the-corner dimension approximately equal to the diameter of the die pot. This close fit centers the billet in the die pot; if the punch is properly aligned, the pierced hole will be reasonably concentric with the outside surface of the forging.

After piercing, the forging is placed in a draw bench; a mandrel which fits into the initial cav-

ity is used to force the forging through a series of draw rings. As the forging passes through these draw rings, its outside diameter is reduced, and the metal is forced down onto the mandrel to form the final cavity and establish the final outside diameter. The final forging operation is to strip the forging from the draw bench mandrel.

A variation of this process used a series of roller draw rings instead of conventional draw rings to obtain the final forging. Each consisted of three rollers encompassing the circumference of the forging mounted in a housing. A series of these roller draw rings, each with a reduced effective diameter, are used, after which the forging is stripped from the mandrel in the conventional manner.

The pierce, roll and draw method of producing shell forgings was developed during World War II, and it is commonly known as the Witter process. The method used for the initial pierce is identical to that in the pierce and draw method.

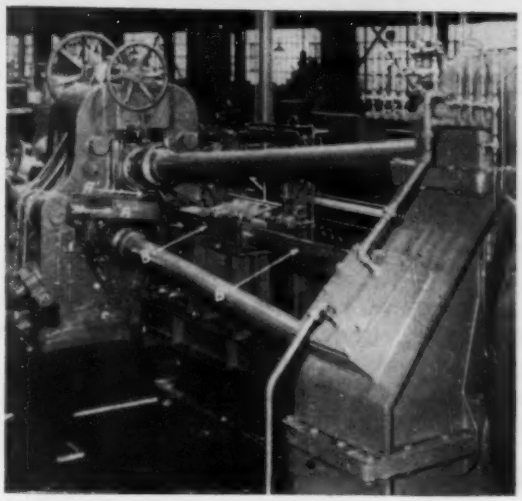


FIG. 2—Witter mill used in the pierce, roll and draw method of producing artillery shell forgings, developed during World War II. At A' is the entry guide, "A" is the blank entry trough, "B" is the front mill ram support, and B' is the mill ram. Salem Engineering Co. photo.

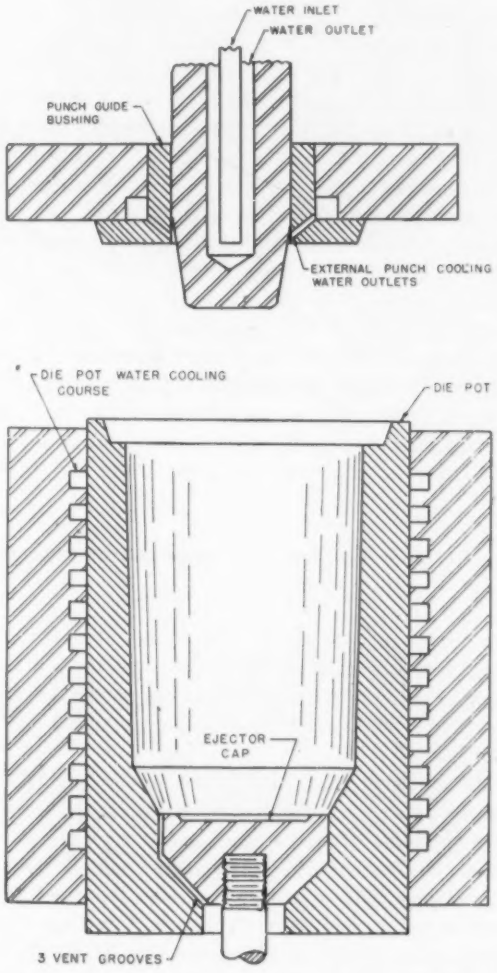


FIG. 1—General arrangement of the die, punch guide ring and punch used in the pierce and draw method. The punch cooling system shown provides adequate cooling while keeping thermal shock at a bare minimum.

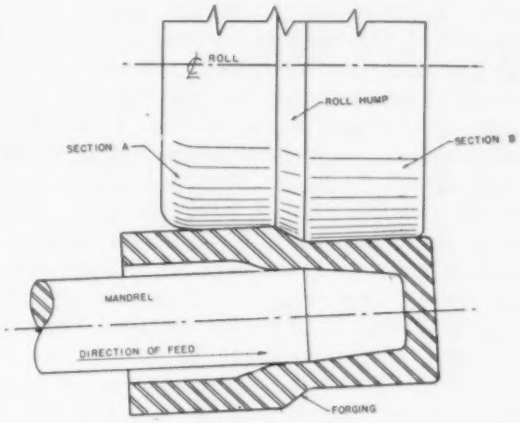


FIG. 3—Power-driven stepped rolls on the Witter mill are mounted at an angle to the line of travel of the ram, which aids feeding. Three such rolls are used.

The pierced billet is delivered to the Witter mill, shown in Fig. 2, where a mandrel of the proper size and shape is inserted into the cavity by a hydraulically-actuated ram. The forging with the mandrel then goes to three power-driven stepped rolls where the forging is rolled out over the mandrel. These rollers are mounted at an angle to the line of travel of the ram to aid feeding.

A cross-section through the forging at one roll is shown in Fig. 3. The roll has three sections of action. Effective diameter at section "A" is slightly less than the outside diameter of the pierced forging. This section guides the

forging and helps provide driving force for feed into the "roll hump." The majority of the forging action occurs at the roll hump, and at this point the forging is rolled onto the mandrel.

The "B" section of the roll helps provide driving force and keep the final forging straight. After the forging has passed through the roll stage, it goes through a single draw ring to establish a controlled outside diameter, and is then stripped from the mandrel.

Single-pass method is limited

The single pass pierce method of producing shell forgings is not economically adaptable to all types of shell forgings. It has been used to produce forgings for high explosive mortar shells, in which case the die design gave a simultaneous piercing, drawing and extrusion action. The drawing action formed the small end of the forging, and was obtained by selecting a billet size which prevented the billet from resting on or near the bottom of the die before the punch contacted the billet. This type of forging action is not conducive to good tool life; the actual tool life obtained was rather short when compared to that of the upset process.

The multiple-pass upset and pierce process was one of the most extensively used methods for producing shell forgings. In this common process of producing commercial forgings, an upsetter of the type shown in Fig. 4 is used to gather the stock required on the end of a short small diameter round. This gathering process usually requires two or three passes or operations. After the stock is gathered, it is progressively pierced in the next two or three passes and the holding ring on the open end of the forging is sheared off in the last pass. The exact number of passes required to produce the finished forging is dependent on the metal distribution in the finished forging. A typical die set is shown in Fig. 5.

If the final forging is to have good concentricity between the inner and outer cylindrical surfaces, the initial piercing operation must be central in all of these forging processes. In the case of forgings produced by either the pierce and draw or the pierce roll and draw methods errors in concentricity existing in the pierced forging before drawing or rolling will not be eliminated by the subsequent operations, because the metal flow is not in the proper direction.

Metal flows axially

The direction of metal flow in a drawing operation is axial as the metal is drawn along the punch or mandrel while the forging and mandrel proceed through the draw rings. The direction of metal flow in the rolling operation of the Witter mill is more complicated, as the metal flows in a spiral. However, the principal direction of metal flow is axial, and experience has proven that it will not correct large errors in concentricity.

To obtain good concentricity in the upset forging process, it is necessary to have uniform stock gather. If a center punch is used in the gathering process to provide a center for the piercing punch, this center must be in the center of the stock, and the piercing punches must be straight and accurately aligned with the die. If this is not followed, the forgings will be eccentric. If the first piercing punch is not properly aligned and produces an eccentric hole, the subsequent punches will follow this hole and all of the punches will be bent.

Concentricity errors can be introduced by nonuniform heating of the forging billet. If the material is not uniformly heated, its resistance to flow is greater in the colder areas. The piercing punch will then follow the line of least resistance and drift into the hotter section, resulting in an eccentric forging and possibly a bent piercing punch.

Scale removal is necessary

To assure good die life and minimum rejects due to forged-in scale, the forging billet must be cleaned before going into the forging die. If scale is not completely removed from the pierced end of the billet, the scale under the piercing punch will be carried into the cavity and will produce a rough cavity. As scale is abrasive, it will wear both the die and punch. If forged into the outside surface of the forging, it will cause excessive tool wear when the shell is machined; it may also cause deep impressions which will not be removed in the machining operation.

Cavity defects can be produced by badly heat checked, cracked or distorted punches. The obvious solution to problems of this type is to make the punches of a material which has high strength at elevated temperatures and is not subject to cracking when cooled from the service temperature. As all of the tools used for shell forgings are subject to continuous, heavy duty, they should be made of the best available material for the service conditions imposed on the tools.

Piercing punches and draw bench and Witter mandrels are in contact with hot steel for definite periods of time and reach excessive temperatures unless they are water-cooled between operations. This dictates the use of a steel which can be safely cooled with water. For this reason these tools are usually made of a 5 pct Cr hot-work tool steel with about 2.5 pct W, which has good hot strength and can be water-cooled from operating temperature.

Trim dies and trim punches are only in momentary contact with the hot forging and con-

sequently do not achieve the high service temperatures found in piercing tools. However, these tools must resist abrasion and maintain sharp edges. For this reason, they are usually made of materials with greater red hardness, usually with about 10 pct W. Due to the low rate of heat buildup in trim tools, it can also be water-cooled.

The care used in heat treating forging tools can have a material influence on their service life. The tool steel suppliers' recommended temperatures for hardening and tempering should be closely followed. If the tool is carburized, its ability to resist heat checking will be materially reduced. Whenever possible, the surface oxide remaining on the tool after heat treatment should be left on to increase the resistance of the tool to seizing and galling. If it is necessary to grind or polish the tool after heat treatment, it should be reoxidized.

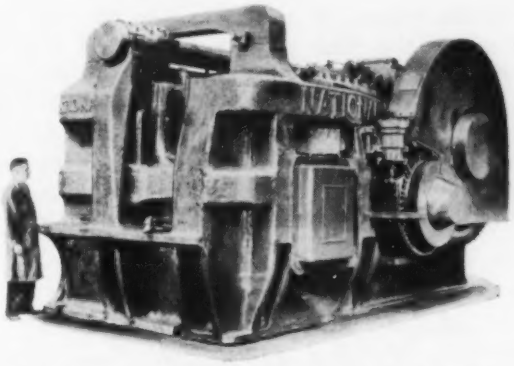


FIG. 4—National forging machine used for shell forging and other upset and deep-pierce operations. It handles stock up to 6 in. diam for the multiple pass-upset and pierce process. National Machinery Co. photo.

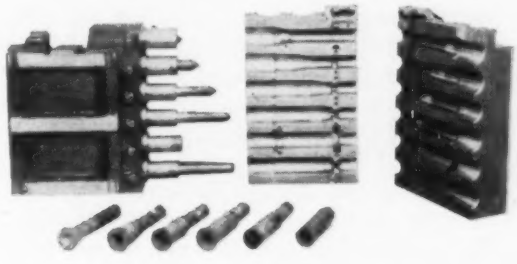


FIG. 5—Typical National 6-in. die set for a six-operation shell job. National Machinery Co. photo.

The resistance of water-cooled forging tools to thermal shock can be increased by designing the cooling system to provide uniform cooling. The punch cooling system shown in Fig. 1 was developed to provide adequate cooling with minimum thermal shock. This external water cooling system consists of sixteen 3/16 in. diam water spray holes directed onto the end of the punch; the tip of the punch is cooled immediately after each forging operation, doubling the life of the punch, giving 3000 forgings between dressings.

When Witter forging mill mandrels are made of solid material, they develop longitudinal cracks or splits near the ends and create objectionable cavity defects. Resistance to the formation of these cracks can be materially increased by drilling a ¾ in. hole in the tool as shown in Fig. 6. This hole reduces the magnitude of the temperature stresses and reduces the thermal gradient in the mandrel when it is cooled.

Cavity defects can be the results of operating practices or improper tool design. An example of a defect resulting from operating practices is spiral cavity cracks in forgings produced by the Witter process. A section from a shell forging rejected for this type defect is shown in Fig. 7.

FIG. 6—Drilling a ¾-in. hole through the Witter mill mandrel helps to reduce longitudinal cracks or splits that might create objectional cavity defects.

It was first thought that the cracks resulted from faulty roll setting, and the amount of reduction at the entrance of the rolls was increased. As this did not eliminate the difficulty, the amount of reduction at the end of the rolls was increased. This change reduced the percentage

FIG. 7—Typical of the defects that can result from operating practices are these spiral cavity cracks in a forging produced by the Witter process. They were caused by emulsified oil on the mandrel cooling water.

of cracked forgings, because it tended to roll the cracks closed.

When the cracks still existed, partially rolled forgings were examined; it was found that the cracks started when the material was rolled down onto the mandrel. At this point they were axial. The spiral angle was imparted by the twisting action of the mill.

A shell forging was analyzed and found to have a carburized cavity. The depth of this carburized case varied from 0.010 to 0.020 in. The carburization was apparently caused by the graphite content of the lubricant used. The piercing press punch was operated dry and the cavity defect disappeared. If the graphite oil lubricant was applied to the piercing punch, spiral cavity cracks would reappear.

During this study it was found that cavity defects could be caused by emulsified oil on the mandrel cooling water. This source of cracks can be eliminated by selecting an oil for cooling water which does not form a tight emulsion. The tendency for the oil to form an emulsion can be reduced by keeping the temperature of the water above 110°F. The adverse effect of emulsified oil on the mandrel can be reduced by keeping the clearance between the pierced hole and the mandrel at a minimum.

One type of cavity defect which is the result of improper tool design is a spoon-shaped depression in the cavity wall, produced by air trapped inside the cavity by the punch. This condition occurs in multiple pass forging when the diameter of the second punch is equal to or greater than that of the first punch.

If the volume of air trapped in this manner is great, the final pressure developed will be sufficiently great to displace some of the hot metal and produce the spoon-shaped defect. This can be prevented by reducing the diameter of the second punch to provide clearance between the punch and the forging. The punch can also be made with vent holes and a compression chamber, as shown in Fig. 8. The air trapped in the compression chamber will keep the vent holes open, as it flows through these holes to and from the compression chamber each time the punch is used, and will keep hot metal from flowing into the vent holes. Air entrapment ahead of mandrels on draw benches will cause similar defects, and these mandrels must be designed to prevent the entrapment of air.

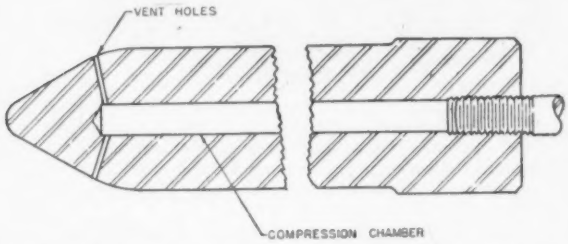


FIG. 8—Vent holes and a compression chamber in the punch absorb air entrapped inside the cavity, which could otherwise produce spoons or blows in the cavity wall.

The solution to most forging problems are simple and only require a careful analysis of the process. The hot metal will always flow in the direction which imposes the minimum resistance to flow. Likewise the forging tools want to follow the line of least resistance. When these basic principles are used to analyze suggested causes for defective forgings, false starts based on mythology can be eliminated.

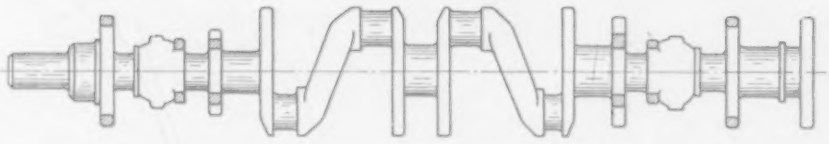
new crankshaft

NOTCHING MACHINE

doubles production

By W. G. Patton
Detroit Editor

Production per square foot of floor space has been more than doubled at Pontiac on a crankshaft notching job. In addition, the special new machine and special cutters used give more tool life, easier regrinding, and reduced setup time.



PONTIAC crankshaft sketch. The cross-hatched areas indicate location of the milled driving and indexing notches.

A complete redesign of its milling machines for notching crankshafts and utilization of Serratip insert-type carbide cutter blades has more than doubled Pontiac's production per square foot of floor space. Tool life has been substantially improved, and time required for tool changes has been reduced.

The operation consists of simultaneous milling of 8 notches. Estimated milling cycle time for each piece is less than 40 sec. Four notches are cut simultaneously at each end of the piece. Two of these are driving notches and two are for indexing, during rough turning.

In contrast to an earlier machine which had vertical spindles and high-speed steel cutters, the new 8-spindle milling machine has horizontal spindles and carbide milling cutter blades backed with serrated steel.

Diameter of one of the cutters used is 3½-in. This tool has 12 teeth. The blade used is a piece of solid carbide. Across the back of the blade, a wafer-thin piece of metal is brazed. After brazing, serrations are made at an angle of 65° with the axis of the tool. The blades are held firmly by a wedge with a mating surface. This construction permits quick, positive positioning, adjustability and rigid anchorage.

The body of the cutter has a set screw under each blade. To resharpen, it is only necessary to loosen the wedge and take up on the set screw. This forces the blade out both radially and endwise, providing grinding stock. The carbide blade can then be ground to proper diameter and thickness.

The blades have a 5° negative rake and an

Cycle Time

	Seconds
Remove and load one piece	20
Rapid traverse advance table 2¼ in. at 80 in. per min	2
Feed 3¾ in. at 16 in. per min	14
Rapid traverse return table 2 in. at 80 in. per min	2
Approximate milling time per piece	38

8° axial rake. No resetting is necessary when a new tool is inserted on the machine.

The special milling machine consists of two 4-spindle sliding head units, each having a mechanical feed. Movement of the table is hydraulically controlled. Spindles operate at a speed to permit 335 fpm peripheral speed of the cutters. A V-belt drive with adjustable driving pulley gives approximately 10 pct above and 10 pct below this speed.

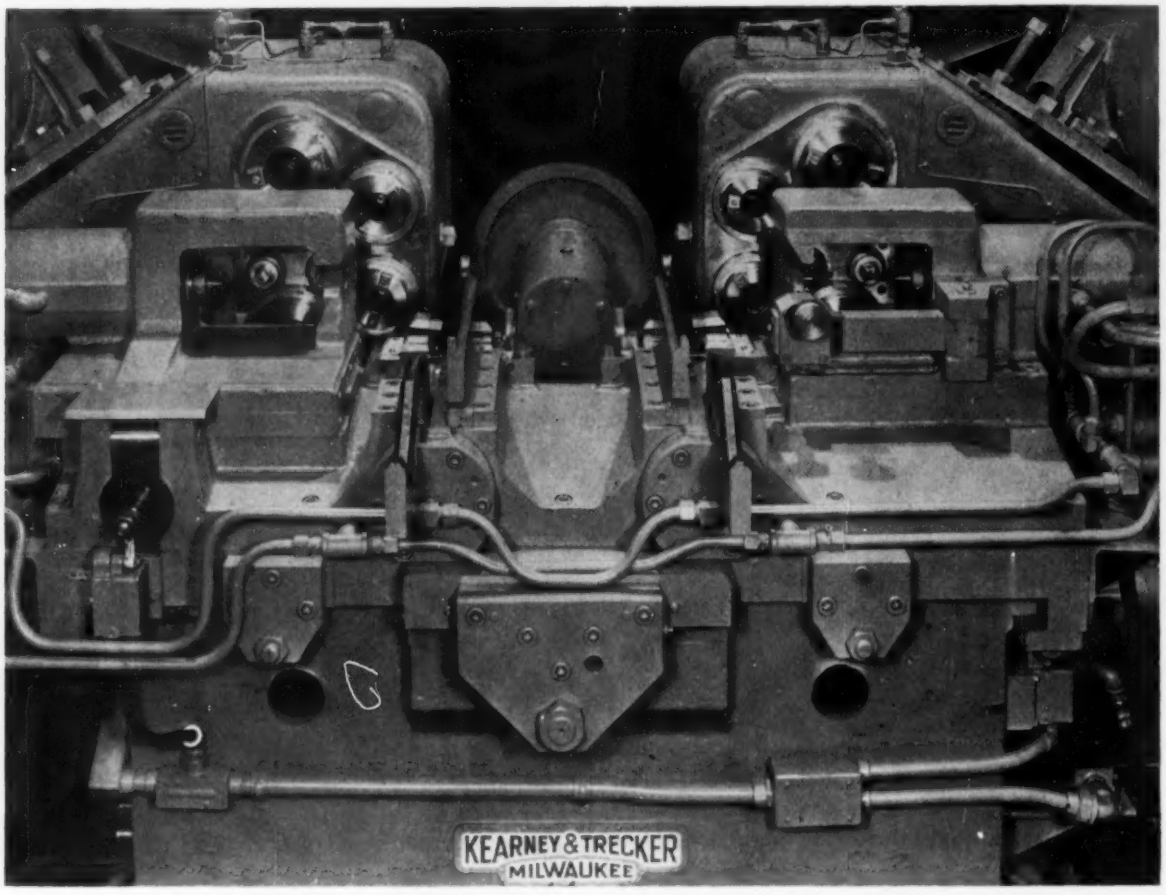
The two inside spindles in each head are No. 40 taper and accommodate 3½-in. diam cutters. The two outside spindles in each head are No. 50 taper and accommodate 6-in. diam cutters.

All spindles are horizontal and have approximately ½ in. of longitudinal quill adjustment. Spindle quills have an eccentric adjustment to compensate for variation in cutter diameters. Spindles are also equipped with an inching adjustment to facilitate cutter setup. A 15-hp motor drives the four spindles in each head.

A 3-hp motor provides feed movements of the two head units. A 5-hp motor is used to clamp the fixture and move the machine table.

The electrical control design conforms to JIC standards. Wherever possible, hydraulics are mounted on the outside of the machine for easy accessibility. No coolant is required. The machine is arranged for climb milling.

As received from the forging source, the water-quenched and tempered SAE 1045 forgings are free of scale, centered and balanced. Specifications call for a hardness of 228 to 260 Bhn. Approximate weight of the rough forging is 105 lb. At the time of delivery to Pontiac from the forging source, the forgings have a prick punch balancing mark to assist the operator in locating the piece in the machine. Positioning of the ends of the crankshaft is completely automatic. The surface prepared for driving notch is approximately ½x7/16 in.



CLOSEUP of the working area of Pontiac's new crankshaft notching machine.

The tooling gives rapid removal of metal and long tool life. Setup time is reduced, and it is simple to maintain both diameter and thickness of the tool on resharpening. Changes in tooling, when necessary, can be made rapidly.

Six months operating experience with its new notch milling machine indicates a carbide cutter life in excess of 400 pieces per grind on a 3½-in. cutter and 800 pieces on a 6-in. cutter.

news of industry

Machine Tool Order Casualty of Rollback Ban

Congressional extension of DPA bans rollbacks . . . CPR 30 and special order for machine tools drop out . . . Industry had been readying for action, is deeper into defense.

The best-laid plans of OPS were spoiled by Congress in its 31-day extension of the Defense Production Act. The legislators in their "temporary" ban on price rollbacks also managed to squeeze out of existence for July the hard-won special pricing order for the machine tool industry.

Machine tool builders once again slipped under GCPR (general pricing order) provisions. It was a frantic day at the Washington OPS office last Saturday when the carefully studied, delayed pricing order was made temporarily extinct. Whether it would be put into effect under a new extension of DPA after July 31 was a subject no one cared to discuss. It had been hinted that the machine tool order would be shown no mercy in the ban but OPS evidently hoped for the best to the last minute.

On Success Wagon

The controls-haters of Congress seemed to be riding the success wagon, ignoring Administration pleas. Now with peace in Korea reasonably certain, they seem to be in a position to continue the go-easy-on-controls attitude. Background to the ban on the pricing order in two important machine tool centers follows:

Machine tool builders were removing restraining leashes made in Washington and were moving on to subcontracting plans, overtime shift premiums, and recruiting of additional labor. All these incentives to production were made possible by the tardy issuance of Supplementary Reg. 2 to CPR 30 which on June 27 eradicated pricing inequities that have held down output.

Most companies contacted by THE IRON AGE were highly pleased with the order. Some regarded it as a long step in the right direction but still leaving many questions to be answered. The principle of the order was unanimously accepted but a few felt the need for clarification of some of the details. One of the things that bothered one company was how it would absorb increased overhead and selling expenses.

One company spokesman said: "The supplement won't affect us any. We were well fortified. We anticipated what would happen and nothing that has happened, as of now, will cause us to change our prices." Another said the industry wanted to charge its own prices. Others thought the order may lead to a point where the industry can charge what it was quoting on Dec. 31, 1951.

Deeper into Defense

The industry is being swept up more quickly into defense work. Firms which once had their plant jammed with civilian orders now find as much as half of their remaining orders are for defense. Other builders who shied away from civilian orders earlier in the year now find their books will be 100 pct on defense. The defense backlog varies.

Some of the smaller companies shudder at the amount of unaccustomed bookkeeping they will

Turn Page

Boron Business Booms

Boron minerals production in the U. S. has almost doubled since 1945. According to a Bureau of Mines report, 647,735 tons of them, containing 191,000 tons of boron oxide and valued at $15,890,000, were used or sold in this country last year. This compares with 325,935 tons of minerals containing 104,600 tons of the oxide and worth $7,635,365 sold or used in 1945.

Five California companies report production of the minerals and their business is on the increase. Also on the increase, to a zooming degree, is the use of boron in steel to replace critically short alloying elements.

Bendix Extends Facilities

Bendix Aviation Corp. has purchased the plant of Continental Can Co., Inc., Utica, N. Y., for the production of Bendix products required by the military services. Employment is ultimately expected to reach 2000. The plant has 220,000 sq ft of floor space.

Bendix has also agreed to purchase Montrose Mfg. Co., South Montrose, Pa. Other new Bendix units are the Pioneer Central Div. at Davenport, Ia., and the Hamilton Div. at Hamilton, Ohio.

New Diesel Engine Plant

Cleveland Diesel Engine Div. of General Motors Corp. will build a new $2,000,000 building near its present plant in suburban Brooklyn, George W. Codrington, GM vice-president and general manager of the Diesel Div., announced. Cleveland Diesel has received more than $25,000,000 in defense orders since the Korean war started a year ago.

INDUSTRIAL SHORTS

50th Anniversary — COLONIAL STEEL CO., Monaca, Pa., a division of Vanadium-Alloys Steel Co., Latrobe, Pa., observed the 50th Anniversary of its founding last month.

Enlarges Capacity—Together with the Willys Toledo Drop Forge Div., WILLYS OVERLAND MOTORS will have a forging capacity of 2000 tons of aluminum and steel forgings per month when it starts operating the plant of Aluminum Forgings, Inc., Erie, Pa.

Changes Name — The manufacturers of Doerr electric motors have officially changed the company name to DOERR ELECTRIC CORP. Formerly Electro Machines, Inc., the change was made to avoid confusion with many other firms of similar name.

Expand Test Facilities — An expenditure of $1.5 million will be made in new construction and expansion by ROOTS-CONNERSVILLE BLOWER CORP., Connersville, Ind., to enable the firm to test centrifugal blowers and compressors.

Plan New Coke Ovens—The SEMET-SOLVAY DIV., Allied Chemical & Dye Corp., has announced plans to construct 76 Wilputte underjet coke ovens at its Ashland, Ky., plant. The new ovens, to be completed by early 1953, will augment the company's coke producing capacity.

Quarter Century Club—There are 133 members of the recently formed Quarter Century Club of the M. W. KELLOGG CO., Jersey City, N. J. The club was formed recently at the company's 50th Anniversary celebration. It is one of the largest petroleum engineering firms.

More Room—With the erection of a new building, KENNAMETAL INC., of Latrobe, will acquire additional facilities for producing "Kentanium."

Chairman Elected—The AUTOMOBILE MANUFACTURERS ASSOC. has announced the election of Charles A. Chayne as chairman of its Engineering Advisory Committee. Mr. Chayne, who succeeds J. M. Crawford, is vice-president in charge of the engineering staff of General Motors Corp.

Boosts Production—Now producing V-8 180 hp engines at a rate of 400 per day, the CHRYSLER CORP. expects to boost its V-8 production to 450 per day. The company continues to be the only car manufacturer recommending regular grade gasoline for 7.5 to 1 ratio high compression engines.

Distributor Named—THE INDUSTRIAL SUPPLIES CO. of Steubenville, Ohio, has been named a distributor for Allis-Chalmers motors and controls in eight eastern and four northern West Virginia counties.

Steel Service Plant—JOSEPH T. RYERSON & SON, INC., held an open house at its new steel service plant, at 3475 Spring Grove Ave., Cincinnati, recently. Ryerson claims it is the largest, most modern steel service plant in the area. High speed machinery for handling, cutting has been installed.

Award Granted — The 1951 Merit Award of the AMERICAN SOCIETY OF INDUSTRIAL ENGINEERS has been awarded to Superior Coach Corp., Lima, Ohio, for leadership in research, engineering, design and manufacture of school and funeral coaches, and ambulances. Robert L. Crinnian, ASIE national president, made the announcement.

Plant Opening — MURRAY-WAY CORP., makers of automatic Micro-Polish units, opened its new plant and offices at Maple Rd., East of Birmingham.

Honest Weight—The TOLEDO SCALE COMPANY is celebrating this year its 50th Anniversary.

have to initiate under the control system. One soothing clause in the order was that under Supplement 2 they don't have to report what their prices are after they have filed under CPR 30. Records must be kept in good order but filing is a thing of the past.

Up to the present time, many jobs have been pushed back on the delivery list by defense orders. Last week, however, the first evidence was received in the Detroit area indicating that, under very exceptional conditions, a machine tool builder might be asked to *stop* work on a nondefense order and reschedule the most pressing defense jobs. There is no immediate indication that civilian tooling now in progress will be stopped ahead of completion.

For the past several months Detroit district machine tool builders have been asked to file their order boards with Washington. While no action has been taken as yet, it is evident that such information would be useful in justifying any steps the Washington planners find necessary to further the defense program.

U.K. Steel Team Gets Ideas

A United Kingdom steel productivity team sails for home this week with several ideas they may use and at least one that American industry could borrow from the British. The 16-man group, headed by Sir Charles Goodeve, F.R.S., director of the British Iron & Steel Research Assn., inspected seven steel plants in the U. S. in a 5-week ECA tour.

Research on Ores

High quality of U. S. raw materials impressed them the most, Sir Charles told THE IRON AGE in an interview last week. At the same time, he said that British experience with high phosphorus ores might be useful to the U. S.

He remarked that because British raw material quality is lower and fuel more expensive, there is a great deal more research in these fields in the United Kingdom. Fuel combustion efficiency is more intensively studied there,

and is probably far ahead of U. S. practice.

Sir Charles feels that one reason for the high productivity of the American steel industry is the warehouse system. British mills will roll as little as a ton of carbon steel without batting an eye; here the warehouse takes care of the smaller orders, permitting more efficient operation.

Safety precautions and safety records also impressed the visitors. Number of workers per furnace is about equal in the two countries, Sir Charles said, though U. S. furnaces are generally larger. Workers per rolling mill are higher in the U. K., he added.

Turbo-Jet Research Planned For Electric Power Production

The possible application of the gas turbine in the production of electric power was urged by Gordon Clapp, chairman of the Tennessee Valley Authority, at the dedication of the Arnold Engineering Development Center, Tullahoma, Tenn.

Asking TVA engineers to cooperate with Air Force Scientists, he said, "The theory of possible application of the gas turbine to electric power production has some marvelous possibilities for the future of TVA in this region." Members of the Air Force Scientific Advisory Board agreed that the planned turbo-jet research could lead to a new type of power.

Factory Accident Rate Rises

Job-injury rates in factories rose during the first quarter about 16 pct above the first quarter rate for 1950, Labor Dept. reports.

Both longer hours and shifting to new types of work have contributed to the rising injury rate.

Machine shop injuries showed fourth greatest increase, up by 7.5 more injuries per million manhours. Miscellaneous iron and steel products rated seventh, with a rate increase of 5.7 to a new high of 17.6, while plate fabrication and boiler shop employment rose from 15.9 to 21, ninth place.

Peace in Korea Will Not Mean Steel Aplenty

Administration will stick to its guns to keep defense rolling . . . Defense program is only now beginning to mature . . . Product mix inbalance may get more critical—*By John Delaney.*

A cease-fire in Korea will not solve the steel supply problem. At least not immediately. Washington will fight hard for the defense program. Defense officials will have plenty of good arguments against easing the pressure now.

A spot check of industry reaction to Korean developments confirmed the view that steel will continue tight for some time. A few who at first expressed the belief that a softening might develop, on second thought admitted there was no real basis for so thinking.

Subcontract Speedup

In the year since the Korean war began, we have been able to do little more than lay the groundwork for the program of building up the military strength of ourselves and our allies. This has taken a lot of hard work, and we are just now beginning to see some results of this planning.

The letting of defense contracts is gathering speed. Defense spending will increase month by month to an expected peak some time in 1952. The Controlled Materials Plan, scheduled to start this month, is geared to fit into this defense spending pattern.

"Make a mental note. No, that's impossible! Write a memo on this..."

Thus there is no reason to believe steel will be any easier to get in the near future—that is for the balance of 1951 and the early months of 1952. The expectation is that in the third quarter about 85 pct of finished steel will be controlled. In the fourth quarter it may approach 100 pct.

The reason for this is that while the present percentage of steel under controls is high many more industries will be covered when CMP takes effect. When steel is allocated to these industries on top of those now participating, the tonnage of steel left in the so-called free market will hardly be worth talking about.

Product Mix Imbalance

In the meantime, product mix is becoming more critical. The percentage of controlled plate, bars, and structurals is just about complete. Other products, while easier, are still hard to pick up. This imbalance will never quite right itself under conditions now.

The one (unwholesome) development that might ease steel procurement would be a recurrence of the spring and summer slump of 1949 when purchasing agents, convinced that a recession was just around the corner, cut inventories to the bone. Later developments proved they were wrong.

This could happen again, but it isn't likely. If the present slump in sales of consumer goods does not pass, Washington may take steps to help. This probably would take the form of an easing of credit controls, which are at least partially responsible for lack of buyer interest. The pressure to liberalize credit is on already—if the Korean fighting ceases, it will mount.

Used Machine Dealers Await Pricing Decision

Controversial pricing by weight question not yet answered by OPS . . . Summer wilts some markets . . . Dealers are honest foes of inflation, suggested OPA pricing—*By Ted Metaxas.*

Used machinery dealers are fretting impatiently on the last mile of waiting for a special pricing order from OPS. The order is still at OPS division level and must still get Mike Di Salle's signature. The ban on rollbacks may knock it out of the running. What makes the waiting so exasperating is that OPS is close-mouthed on whether or not it will withdraw its ill-received proposal that used machinery be priced by weight and age.

Further irritant to the field now is the effect OPS hemming and hawing is having on business. Hearing of coming rollbacks in used equipment, some buyers have decided to wait. Summer heat has also wilted the volume of inquiries in many important used equipment centers.

Business Will Grow

But despite the minor frustration of the present, dealers are expecting business to really open up when smaller firms are dragged more deeply into defense subcontracting. The outlook for the rest of 1951 and 1952 is described as encouraging.

The biggest worry of the field is getting enough late-model machines to satisfy demand. Firms on the brink of entering defense subcontracting are reluctant to release machines which they believe may be needed in the future. A fruitful source of good machines has been snatched from dealers. Now auctions are attended by plant buyers who bypass the dealers and bid outrageously high prices. Most of these eager people are from plants active in defense work who have contracts or certificates of necessity in their pockets and are willing to tool up at any cost.

Inflation Foes

Used machinery dealers were honestly lined up against inflation. They have seen the prices of the used stretching their necks to rival those of the new. They have sold a machine at one price on Monday and were asked for more than the purchase price to replace it on Friday.

They proved their antagonism to rising prices in August 1950 when they suggested the price spiral in their industry be foiled by employing the OPA-proved method of pricing strictly by age and condition. Again in February when dealers rushed to Washington at the summons of OPS they put their pricing system on the line—and unfortunately they returned to their shops thinking that all was well.

The OPS proposal was sprung with the suddenness of a hangman's trap. The field rallied and by force of logic and persistence they made OPS reconsider its proposal. Machinery Dealers' National Assn. accepted the worth of the OPS order almost in full as beneficial to the country but reneged at weight pricing. Now the field's industry commiteee has rested its case and OPS has taken its suggestions "under advisement."

Meanwhile, dealers are glad that their warehouses were not overloaded with high-priced late equipment. They feel that with a rollback, machines they had bought at premium prices would have gone for less, leaving them in a financial morass. A quicker spread of defense contracts, they feel, would have two valuable benefits: stimulating buying and yet forcing the release of unneeded machines from plants of cautious manufacturers.

INDUSTRIAL AIRLIFT: A Douglas DC-3 brings in track shoes for International Tractors delivered previously by planes of the Labrador-Quebec iron ore mine construction project's airlift. A Fairchild C-119 Flying Boxcar on loan from the Air Force is helping out.

1000 Workers to Produce Rockets

Oldsmobile will employ 1000 workers in the production of 3.5-in. rockets for the Army super bazooka, according to J. F. Wolfram, general manager of Oldsmobile and vice-president of General Motors. At present 400 persons are working in the Oldsmobile rocket plant which has been converted in less than five months. The plant was formerly used for the production of Olds six-cylinder engines.

The Oldsmobile assembly includes the high-explosive antitank head, practice head, trap and spacer assembly, and the motor metal parts assembly. The rockets are loaded at a government plant. Ten subcontractors supply 15 production parts and an additional 12 items are furnished by seven other suppliers.

Phillips Petroleum to Hike Oil Capacity to E. Chicago, Ind.

Phillips Petroleum Co. announced plans to enlarge transmission capacity between Borger, Tex., and East Chicago, Ind., by 30,000 bbl per day. This will be done through the laying of 500 miles of pipe between the two cities.

The connection between this announcement and Phillips' arrangement with Barium Steel Co. for 21,000 tons of pipe in return for a partnership in wildcat oil drilling is indirect. Most of the Barium pipe will be drill pipe. However, in case of a pinch Phillips will be in a position to bargain for whatever line pipe it needs to complete the expansion project.

The Petroleum Administration for Defense has granted priorities for the line pipe, with delivery scheduled for third quarter.

Alabama Coal Slumps; Captive Mines Keep Going to Feed Steel

Coal mining in Alabama has hit the skids and shows no signs of being able to right itself. Several mines have blocked up their shafts indefinitely and more than 2000 miners are twiddling their thumbs.

Mine owners blame high costs that confine their market to within the state and halts competition outside. Increased use of natural gas and oil has wrested many sales from Alabama coal and declining demand has resulted in heavy stockpiles above ground.

Captive coal mines of steel companies are not vulnerable to coal's slump here. Production must keep going at a fast pitch to meet demands of high steel output.

New Powdered Metals Plant

Intending to triple its production of self-lubricating bearings and structural and mechanical parts made of sintered metal powder, Wel-met Co., of Kent, Ohio, will build a $500,000 plant at Salem, Ind.

Good Housekeeping

Skidding and bumping on rough, unsurfaced ground, industrial trucks give haphazard performance on storage sites outside manufacturing plants. Solid foundations and smooth surfaces can make these plant "yards" more valuable storage factors.

Now that manufacturing space is at a premium the trend to outside ground storage is increasing. It may be good housekeeping to have a neat storage system on surfaced land that permits efficient flow of truck traffic.

In the above photo (Courtesy of Elwell-Parker Electric Co.) an eastern company making drop forgings laid a solid foundation between plant buildings. It gained considerable storage area and inside buildings are now occupied mainly by production equipment. Forging blanks cut from bars are carried in tote boxes and frames to "weather" before being carted to forge shops and heat treating departments. The firm has an efficient traffic system for all raw materials and products moved anywhere in the storage area.

Mill Construction Progressing

Officials of the Lone Star Steel Co. indicate that work on their new completely integrated steel mill in East Texas is progressing on schedule. They stated that materials for the plant, which will produce steel tubing for oil country use, were also coming through on schedule.

Construction commitments of the company's $75,425,201 mill have reached $32,781,799, according to E. B. Germany, Lone Star president. Of the commitments already made, $26,526,599 are covered by contracts approved by the Reconstruction Finance Corp. The remaining $6,255,200 is covered by letters of acceptance.

To Build Steam Power Plant

A steam electric power generating plant costing $30 million will be built by Alabama Power Co. on the Mobile River at Salco, Ala. Groundbreaking for the first two units of the eight-unit plant will be held on July 20.

The plant will be built in units, two at a time, by General Electric Co. Each unit will have 125,000-kw capacity and will operate at a steam pressure of 1800 lb per sq in. It will burn 800,000 tons of coal annually.

Total plant capacity will reach 1 million kw by 1956 or '57. First unit completion is scheduled for late 1953.

BITS AND BRIEFS

By Bill Packard

Even the telephone operators at some swanky New York hotels speak in Harvard-like tones . . . Advice to young men: Never mind going West; your future is practically assured if you attend engineering school. The engineer shortage is still critical. About 80,000 are needed, exclusive of military requirements. The current graduating class is 38,000, leaving deficit of 42,000 . . . **Above-capacity operations in steel for rest of year is almost a certainty. Reason: American Iron & Steel Institute will not revise capacity until year-end and production already is at rate of 107 million annual tons compared with rated industry capacity of 104.2 million tons** . . . A Pittsburgh couple trapped by New York City's no-parking laws drove around city 4½ hrs, finally left because of hunger and thirst . . . Machine tool order backlog reached peak of 13.5 months in World War II, is now close to 20 months, compared with 9 months at start of Korean war . . . **We may not outnumber or outslave Russia, says General Electric Co., but we can outmuscle the Reds in electrical manpower and outproduce them in the factories** . . . Harry A. Schwartz, manager of research of National Malleable & Steel Castings Co., Cleveland, has been awarded the 1951 McCrea Medal for outstanding service to the malleable castings industry . . . Horn-blowing department: Your favorite family journal discussed points of OPS machine tool orders in issue of June 21. The story was released generally a week later . . . **Impact of the defense program is growing. A survey by Commerce and Industry Assn. of New York shows that almost one-half of the manufacturers contacted are doing government work, amounting to one-third of their total volume** . . . "Airlift" of heavy construction equipment to Labrador-Quebec ore fields while not as spectacular or urgent as the Berlin airlift is probably as important to our future security.

March Finished Steel Shipments

As Reported to the American Iron & Steel Institute

STEEL PRODUCTS	CURRENT MONTH Carbon	Alloy	Stainless	Total	Pct of Total Shipments	TO DATE THIS YEAR Carbon	Alloy	Stainless	Total	Pct of Total Shipments
Ingots	75,970	19,614	1,747	97,331	1.5	316,258	73,200	7,217	398,675	1.5
Blooms, billets, tube rounds, sheet bars	125,050	47,523	1,675	174,248	2.6	536,720	180,811	5,878	723,409	2.7
Skelp	14,194			14,194	0.2	45,540			45,540	0.2
Wire rods	72,949	2,260	325	75,534	1.1	282,021	7,435	1,434	290,890	1.1
Structurals	406,943	5,346	2	412,291	6.2	1,600,845	25,545	42	1,626,432	6.2
Steel piling	34,727			34,727	0.5	131,521			131,521	0.5
Plates	610,190	41,262	1,659	653,111	9.8	2,333,993	*144,387	5,973	*2,484,353	9.4
Rails—standard	146,933	14		146,947	2.2	550,003	74		550,077	2.1
Rails—all other	15,473	5		15,478	0.2	46,053	24		46,077	0.2
Joint bars	12,132			12,132	0.2	45,297			45,297	0.2
Tie plates	39,522			39,522	0.6	155,545			155,545	0.6
Track spikes	14,369			14,369	0.2	55,669			55,669	0.2
Wheels	32,738			32,738	0.5	130,432	40		130,472	0.5
Axles	19,063	44		19,107	0.3	74,596	142		74,738	0.3
Bars—hot-rolled	552,643	179,417	3,555	735,615	11.1	2,194,053	730,746	13,774	2,938,573	11.1
Bars—reinforcing	140,568			140,568	2.1	597,878			597,878	2.3
Bars—cold-finished	126,338	28,777	3,471	158,586	2.4	493,262	109,624	14,001	616,887	2.3
Bars—tool steel	2,327	11,212		13,539	0.2	9,419	42,442		51,861	0.2
Standard pipe	250,102	70	3	250,175	3.8	965,176	522	18	965,716	3.7
Oil country goods	140,540	19,779		160,319	2.4	538,597	72,900		611,497	2.3
Line pipe	238,091	130		238,221	3.6	*962,375	483		*962,858	3.6
Mech. tubing	57,453	26,740	506	84,699	1.3	224,553	93,918	2,057	320,528	1.2
Pressure tubing	20,912	1,737	831	23,480	0.4	85,957	6,984	3,298	96,239	0.4
Wire—drawn	270,433	4,390	2,691	277,514	4.2	1,095,317	18,410	10,332	1,124,059	4.3
Wire—nails, staples	74,182		4	74,186	1.1	297,786		17	297,803	1.1
Wire—barbed, twisted	19,541			19,541	0.3	76,960		1	76,961	0.3
Wire—woven fence	39,299			39,299	0.6	151,376			151,376	0.6
Wire—bale ties	9,167			9,167	0.1	33,350			33,350	0.1
Black plate	85,403			85,403	1.3	326,166			326,166	1.2
Tin & terneplate—hot-dipped	129,195			129,195	1.9	537,389			537,389	2.0
Tinplate—electrolytic	232,003			232,003	3.5	921,793			921,793	3.5
Sheets—hot-rolled	670,003	25,288	3,700	698,991	10.5	2,745,022	110,620	13,00*	2,868,644	10.9
Sheets—cold-rolled	823,545	9,747	7,565	840,857	12.7	*3,356,240	37,960	33,096	*3,427,296	13.0
Sheets—galvanized	173,396	733		174,129	2.6	668,328	4,935		673,263	2.5
Sheets—other coated	23,250			23,250	0.4	87,041			87,041	0.3
Sheets—enameling	18,089			18,089	0.3	74,378			74,378	0.3
Electrical sheets, strip	13,110	52,378		65,488	1.0	49,458	206,300		255,758	1.0
Strip—hot-rolled	212,085	3,815	830	216,730	3.3	870,813	14,508	2,358	887,679	3.4
Strip—cold-rolled	163,219	2,566	17,952	183,737	2.8	*844,351	9,795	70,626	*724,772	2.7
TOTAL	6,105,147	482,847	46,516	6,634,510	100.0	*24,313,531	*1,891,805	183,124	*26,388,460	100.0

During 1950 the companies included above represented 99.0% of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Revised.

Cost Accounting Problems Discussed at Annual Conference

Rapid amortization of facilities and changes in "ground rules" urged

Though prices may be government controlled, costs of production and maintenance of industry are still the concern of the accountant. These government controls, corporate methods, and problems of accounting procedure were discussed at the 32nd Annual International Cost Conference of the National Assn. of Cost Accountants last week.

Speaking to more than 2500, gathered at the Palmer House in Chicago, Carman G. Blough, research director of the American Institute of Accountants, said rapid amortization of defense production facilities is a proper and legitimate part of the cost of the defense program.

Recognized by Law

Stating his opposition to a Congressional proposal to disallow these costs in renegotiation, he pointed out that they are now recognized by law. Mr. Blough also called attention to the fact that where facilities are now being used on a 3-shift, 7-day week, they are being worn out faster than in normal operations and it should be reasonable to allow faster depreciation.

Citing conditions which create misunderstanding between government and industry, Charles E. Headlee, controller at Westinghouse Electric Corp., Pittsburgh, called upon industry to exert a combined effort to effect changes in unfair and wasteful "ground rules." In referring to contractor-government relationships, he said that cost reduction rather than profit reduction should be the objective.

English Nationalization Feud into the Open

Minister of Supply accuses steelmen of tripping up Steel Corp. . . . Cites refusal to sit on committee, give up raw materials agencies . . . Steelmen counter with their own logic.

The cold war between the British Iron & Steel Federation and the Steel Corp., organized to snatch up 90 pct of the English steel industry under the Nationalization Act, had been conducted with kid gloves. But kid gloves did not soften the impact of haymakers thrown by steelmen.

Now a Public Battle

Tired of being politely frustrated, G. R. Strauss, Minister of Supply, made the "war" a slambang public battle. He openly accused the Federation of using every trick, "legal or otherwise," to manhandle the government's Steel Corp.

Threatening drastic action to bring the steelmen to heel, Mr. Strauss spoke at the annual conference of the Amalgamated Union of Foundry Workers. He charged the Federation with noncooperation. This despite public ownership of 90 pct of British steel while almost 90 pct of the Federation's income came from Steel Corp. companies.

With all good intentions the Steel Corp. asked the Federation for one steel-wise member to sit on the committee organizing work for the few private companies, said Mr. Strauss. The answer was a genteel "no."

Help the Housebreakers?

Steelmen wondered why they should be called on to guide green Steel Corp. officials in what they considered was a crime against an industry that had proven its worth. They take the long-range view that if the Steel Corp. falls through mismanagement it will be a benefit to the country. Anyway, they see a fall election coming up. Voters may get sensible and desert the Labor Party's fouled-up Utopia. In that case, nationalization of steel is doomed.

Mr. Strauss had more to say. He accused the Federation of refusing pointblank to relinquish its commercial machinery for purchasing foreign iron ore, scrap, and other raw materials. The Corporation has been patient, but the Federation has not budged. He added bitterly that when the Corporation took over steel the raw materials cupboard was bare.

Federation's Stand

The Federation struck back. It published letters between the Steel Corp. and the Federation. The latter's argument was that purchasing services of the Federation had taken a long time to build. They served both publicly-owned and private firms in the Federation and private firms outside the Federation.

Government spokesmen in Parliament had stressed that in the early phase of nationalization no drastic moves be made. To take over the Federation's raw materials agencies would endanger the industry and rearmament.

Therefore, no soap. Question now is how tough will Mr. Strauss get? If he legislates the agencies into the Steel Corp. and they flop under inexperienced hands, the fate of steel nationalization may be decided then and there—unfavorably.

National Tube's Oil Well Casing Produced Commercially

A new, tougher oil well casing developed by National Tube Co. is now being produced on a commercial basis following installation of necessary equipment at the company's McKeesport, Pa., plant.

The quenched and drawn carbon-manganese steel developed physical properties in 7-in. diam casing of 110,000 psi minimum yield strength at 0.6 pct total strain, 139,000 psi average ultimate strength and 22.4 pct average elongation in 2 in.

New equipment for production of the casing includes a heating line, a quench ring, a separate tempering furnace and straightening equipment. Seven barrel-type furnaces in the heating line are capable of handling pipe up to 10⅝-in. outer diam.

STEEL PRODUCTION (Ingots and Steel for Castings)

As Reported to the American Iron & Steel Institute

	Openhearth		Bessemer		Electric		Total			
1950	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Calculated Net Tons Weekly	No. Weeks in Month
1st Qtr.	20,032,745	93.4	900,543	65.9	1,309,363	77.3	22,242,651	90.7	1,729,600	12.86
Apr.	7,318,720	102.3	407,909	89.5	497,875	88.1	8,224,504	100.6	1,917,134	4.29
May	7,601,880	102.9	437,006	92.9	525,321	90.0	8,564,207	101.4	1,933,230	4.43
June	7,222,185	100.9	406,944	89.3	514,101	90.9	8,143,230	99.6	1,898,189	4.29
2nd Qtr.	22,142,785	102.0	1,251,859	90.6	1,537,297	89.7	24,931,941	100.5	1,916,367	13.01
1st 6 Mos.	42,175,530	97.7	2,152,402	78.3	2,846,660	83.5	47,174,592	95.7	1,823,525	25.87
July	7,224,306	97.0	380,317	79.8	478,299	79.7	8,082,922	94.8	1,828,715	4.42
Aug.	7,318,908	98.0	405,118	84.8	518,148	86.1	8,242,174	96.5	1,860,536	4.43
Sept.	7,262,359	100.7	409,216	88.7	533,422	91.7	8,204,997	99.4	1,917,055	4.28
3rd Qtr.	21,805,573	98.6	1,194,651	84.4	1,529,869	85.8	24,530,093	96.9	1,868,248	13.13
9 Mos.	63,981,103	98.0	3,347,053	80.4	4,376,529	84.3	71,704,685	96.1	1,838,582	39.00
Oct.	7,734,714	103.6	436,835	91.5	581,137	96.6	8,752,686	102.4	1,975,776	4.43
Nov.	7,111,829	98.4	370,659	80.1	540,905	92.8	8,023,393	97.0	1,870,255	4.29
Dec.	7,434,863	99.8	380,011	79.8	540,437	90.0	8,355,311	98.0	1,890,342	4.42
4th Qtr.	22,281,406	100.6	1,187,505	83.8	1,662,479	93.1	25,131,390	99.2	1,912,587	13.14
2nd 6 Mos.	44,086,979	99.6	2,382,156	84.1	3,192,348	89.4	49,661,483	98.0	1,890,426	26.27
Total	86,262,509	98.7	4,534,558	81.3	6,039,008	86.5	96,836,075	96.9	1,857,232	52.14
1951[2]										
Jan.	7,844,982	101.4	431,725	90.4	566,460	88.3	8,843,167	99.9	1,996,200	4.43
Feb.	6,935,512	99.3	326,112	75.6	504,077	87.0	7,765,701	97.1	1,941,425	4.00
Mar.	8,059,625	104.2	408,926	85.6	602,504	93.9	9,071,055	102.4	2,047,642	4.43
1st Qtr.	22,840,119	101.7	1,166,763	84.2	1,673,041	89.8	25,679,923	99.9	1,996,884	12.86
Apr.[2]	7,857,161	104.9	392,472	84.9	590,888	95.1	8,840,521	103.1	2,060,728	4.29
May[2]	8,070,000	104.3	409,000	85.6	615,000	95.8	9,094,000	102.7	2,053,000	4.43

Note—The percentages of capacity operated (1951) are calculated on weekly capacities of 1,746,337 net tons open hearth, 107,806 net tons Bessemer and 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of January 1, 1951 as follows: Open hearth 91,054,020 net tons. Bessemer 5,621,000 net tons, Electric 7,554,630 net tons, total 104,229,650 net tons.

[1] Revised. [2] Preliminary.

Small Manufacturers Group Gets Senator's Support at Meeting

Sen. Sparkman outlines objectives of his Small Business Committee

Senator John J. Sparkman, D., Ala., speaking before a group of 400 small manufacturers, asserted that his Senate Committee on Small Business had as its objectives the reduction of red tape in Federal purchasing, protection of small firms against exorbitant prices, a relaxing of monopolistic pressures on small firms, full participation by small business in foreign aid programs, and a fair share of basic supplies and materials.

Business with Government

The manufacturers were conducting a conference at the plant of Eastern Brass & Copper Co., N. Y., to discuss their problems of how to do business with the Government. In addition to the senator, there were also on hand representatives of the various armed services and the National Production Authority.

With a possibility of peace developing in Korea, Senator Sparkman insisted that the nation must not curtail its defense program. As to small manufacturing groups, he felt that they should be getting an increased amount of defense contracts, although their position is jeopardized because of negotiations rather than advertised bidding for government contracts.

Priorities Aid for Research

Technical and scientific laboratories will be given priorities aid in obtaining materials for important research projects through a self-certification basis authorized by a new NPA order, M-71.

Under the order, controlled materials may be purchased by application to the symbol "X1" in the following quarterly amounts:

Carbon steel, 5 tons; alloy, except stainless, 1000 lb; stainless, 500 lb; copper and alloy, brass and copper wire mill products, copper and copper base alloy foundry products and powder, 500 lb, and aluminum, 500 lb.

Other-than-controlled materials may be obtained through self-certification, provided quarterly purchases do not exceed $3000 in amount.

Rescind Interim Help Orders

Directions have been issued by NPA rescinding three orders—M-55A, M-60, and M-61—to become effective as of the dates on which individual manufacturers receive their CMP allotments.

These were the orders which provided interim help to makers of farm machinery, machine tools, and specified components.

In this connection, NPA is also preparing an amendment to CMP-1 which designates CMP as the controlling factor on production rather than the joint NPA-CMP control now existing under Sec 3 (c).

Read Union News at Home

NLRB has ruled that an employer may forbid distribution of union literature within a plant, if the ban does not discriminate between unions and if it is not intended to suppress employees' organizing activities.

Cut Back Steel for Power?

Warning that steel supplies will be inadequate to meet the power industry's expansion plans, the Defense Electric Power Administration is now urging the industry to go over their blueprints, seeking to reduce the amounts of steel requested.

Conversion to New CMP Ratings

As of June 30, under Sched. 1 to NPA-2, outstanding rated orders from the Defense Dept., Coast Guard, and Atomic Energy Commission are automatically converted to the new CMP ratings and symbols.

Industry Controls This Week:

NPA Orders

M-55A, M-60, M-61—Rescinds interim help orders on farm machinery, machine tools and components. Effective on CMP allotment receipts.

Dir. 3, Reg. 1—Consumer may not order, for delivery in any 1 month, more than 35 pct of quarterly allotment. Not required to reduce order below minimum mill quantity specified in Sched. IV of CMP-1.

M-71, Priorities—Aid for technical and scientific laboratories on a self-certification basis. Effective immediately.

OPS Orders

CPR 30, Suppl. Reg. 2—Cost-price relief for machine tool builders. Order permits builders to reflect overtime, subcontracting, and second and third-shift labor costs in price ceilings. Effective June 27.

Reemployment Rights Granted Under New Military Service Act

Under the new military training and service act, a person may serve 4 instead of 3 years and still have reemployment rights. This is retroactive to June 24, 1948, so as to benefit either inductees or reservists who may for one reason or another serve a somewhat longer period than the usual 3-year tour.

Coverage is also broadened to make mandatory the reinstatement of an employee who may have quit to enlist or be drafted and then be rejected. This applies to reservists who are called but released after a short training period. Applications in both cases, however, must be filed within 30 days after release.

CMP Limits Monthly Deliveries

Dir. 3 to CMP Reg. 1 provides that no prime consumer of controlled materials may order for delivery in any 1 month more than 35 pct of his quarterly allotment.

Reduction of a delivery order below the minimum mill quantity specified in Sched. IV of CMP-1 is not required, however.

DEFENSE CONTRACTS

Week of July 5, 1951

Radar sets, components—Gibbs Mfg. and Research Corp., Janesville, Wis.
Machinery and equipment—Pryor Mfg. Co., Mansfield, Ohio
Machinery and equipment—Western Electric Co., New York, N. Y.
Aircraft components — Sperry Gyroscope Co. Div., Great Neck, Long Island
Turbo-jet engine assy. — Allison Div., GMC, Indianapolis, Ind.
Lathes and accessories—The New Britain Machine Co., New Britain, Conn.
Printing press—American Type Founders Sales Corp., Washington, D. C.
Motors—Star Kimble Motor Div., Miehle Printing Press & Mfg. Co., Bloomfield, N. J.
Pump, main feed—Worthington Pump and Machine Corp., Harrison, N. J.
Aluminum drums—Benson Mfg. Co., Kansas City
Bomb handling slings — Waco Aircraft Co., Troy, Ohio
Machine tools—The LaPoint Machine Tool Co., Hudson, Mass.
Power plant spare parts—The Buda Co., Harvey, Ill.
Air compressor spare parts—Dayton Air Compressor Co., Dayton, Ohio
Miscellaneous assemblies — North American Aviation, Inc., Los Angeles
Spare parts—Bendix Aviation Corp., South Bend, Ind.
Compass system components — Sperry Gyroscope Co., Great Neck, Long Island
Instrument parts—Kollsman Instrument Corp., Elmhurst, N. Y.
Mobile training units—Fairchild Aircraft Div., Fairchild Engine and Airplane Corp., Hagerstown, Md.
Helicopters—Piasecki Helicopter Corp., Morton, Pa.
Turbosupercharger spare parts—General Electric Co., Schenectady, N. Y.
Aircraft parts—Dumont Aviation and Supply Co., Long Beach, Calif.
Aircraft spare parts—Durham Aircraft Service Inc., Woodside, N. Y.
Heat exchangers—Air Research Mfg. Co., Los Angeles
Hydraulic pumps—The New York Air Brake Co., New York
Miscellaneous parts—American Type Founders, Inc., Elizabeth, N. J.
Automotive spare parts—Western Mfg. Co., Detroit
Power plants spare parts—Fairchild Engine Div., Fairchild Engine and Airplane Corp., Farmingdale, Long Island.
Special tooling — Perkin Elmer Corp., Glenbrook, Conn.
Machine tools—The Lodge and Shipley Co., Cincinnati
Turbine assemblies—Air Research Mfg. Co., Los Angeles

Congress Orders Rollback Ban

Sales of machinery, machine tools, and manufactured products will continue at OPS general freeze prices during July. A Congressional ban on rollbacks forced OPS to suspend the pre-Korea rollbacks it had planned to put in effect on July 2. OPS said that prepared price regulations for iron and steel products would have resulted in price reductions of from $1 to $3 per ton for warehouses. In addition, OPS said, they would have established a uniform markup over costs for sales of excess stocks, and would have limited brokers to mill prices.

Start Training Workers, Agency Warns Birmingham Metalworkers

The Birmingham metalworking industry has been warned by the Alabama State Employment Service to start training workers. The agency said serious shortages exist in eight occupations here and little worker aid will come from other cities.

Birmingham industries are being pushed behind the eightball by defense plants in other areas which got the jump with defense contracts and raided the city's labor force, the agency said.

Shortage jobs in Birmingham include: machinist, tool and die maker, electrical engineer, mechanical engineer, turret lathe operator, major aircraft assembler, engine lathe operator, and milling machine operator. The list could apply lock, stock, and barrel to many other manufacturing centers.

Would Lease Bantam Car Plant

Thompson Products, Inc., has offered to lease the American Bantam Car Co.'s plant in Butler, Pa., for at least 3 years, Harry D. Bubb, vice-president of Thompson and general manager of the Tapco plant here, announced.

American Bantam has been in receivership for over a year. Annual rental offered by Thompson to trustees of the property is $240,000. Thompson would buy the equipment for $401,000.

Industry Fosters Cooperation

Some 85 Ohio, Michigan, Indiana, Illinois and Wisconsin business men formally organized the Great Lakes States Industrial Development Council, at a meeting in Hotel Carter here. Aims of the group, as outlined by Charles H. Slayman, permanent chairman, are to foster cooperation among the five states in order to hang on to present industry, bring more factories in and act in general as a mutual aid society.

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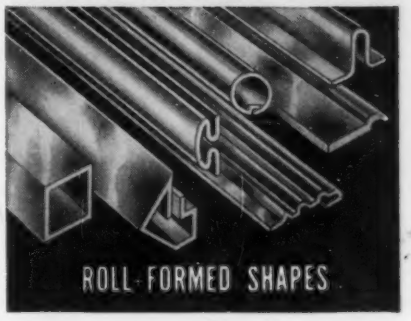

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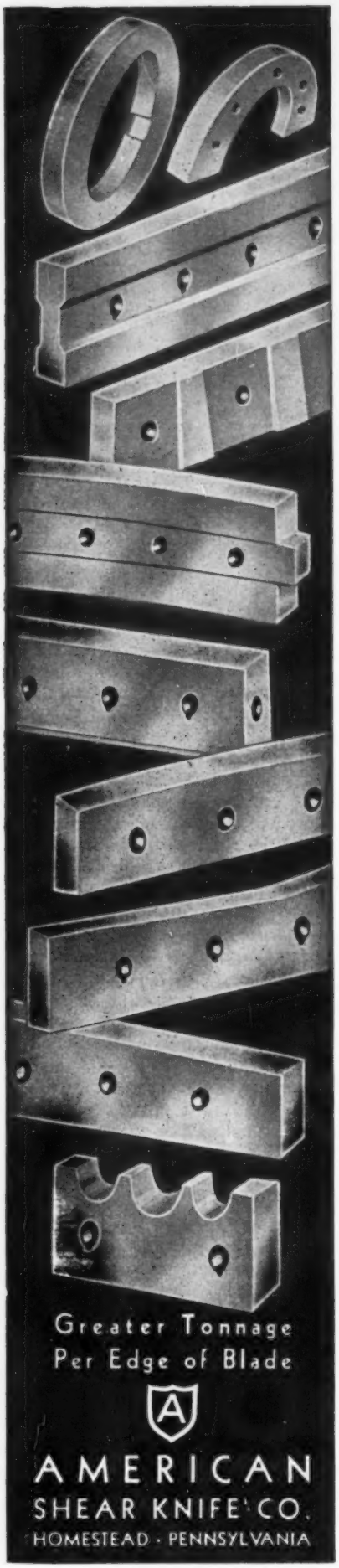

Tests Show "Invasion" Pipe Suitable for Field Operations

Aluminum invasion pipe has just finished its basic training in Uncle Sam's Army, undergoing rugged tests in Alaska, at Yuma, Ariz., and at the Engineering Research and Development Laboratories, Fort Belvoir, Va.

The tests showed that the aluminum invasion pipe was suitable for carrying oil, fuel and water to operational areas of a mobile army and an emergency-based air force. The use of this pipe would also reduce traffic problems in congested battle areas and conserve fuel which would otherwise be used by fuel-carrying vehicles.

Modern trends toward an airborne army demand equipment suitable to air transportation. A helicopter can more than double its load-carrying capacity by hauling aluminum pipe instead of steel.

Utility of aluminum pipelines is increased by an aluminum coupling on which the Aluminum Co. of America played an important part in design. Weighing only 4 lb as compared with 12 lb in steel, it is a grooved, bolted coupling sealed with a special kind of rubber gasket.

Novel Group Discussion Program

Westinghouse Electric Corp. has started a new program to stimulate group discussion among its 105,000 employees on the benefits of the American way of life. The program consists of two 1-hour sessions for Westinghouse employees.

According to Tom Turner, vice-president in charge of plant labor relations, the best way to explain the American free enterprise system is to stimulate discussion of it.

Plans Electrical Equipment Plant

A $1 million plant to manufacture electrical equipment will be built by the fall of 1952 by the Appleton Electric Co., of Chicago, on a site in Trussville, Ala. Construction will start later this year. The plant will have 70,000 ft of floor space.

Lead Production Facilities Bought by Chicago Businessmen

Glidden Co. has sold its secondary metals operations at Hammond, Ind., to a group of three Chicago businessmen. The facilities include a lead refinery and equipment for the production of type metal, babbitt, solder and antimonial lead products.

The new owners are Milton Silverstein, head of Milton Silverstein & Associates, metal brokers; Max Swiren, an attorney, and Seymour Richek, president of Metal Supply Service Co.

The secondary metals plant is located on a part of the company's chemical and pigment division property.

Dwight P. Joyce, Glidden president, said the company will consolidate all its powdered metals operations at the Hammond site, and will increase its production of cuprus oxides, lead, iron and copper powder and brazing compounds.

Lows Offset the Highs

The Austin Co.'s index of industrial building costs held at 182 during the second quarter, when the softening of prices on some products just about offset the limited advances in other building materials.

"Some of the problems created by manpower, material and equipment shortages are being overcome by careful planning, but the manner in which the temporary materials control measures are being applied has, in some instances, completely upset schedules established months ago," George A. Bryant, Austin's president, stated.

Plans Phosphorus Plant

Monsanto Chemical Co. has picked Soda Springs, Ida., as site for a multi-million dollar elemental phosphorus plant. Construction will start this summer with Morrison-Knudsen Co., of Boise, as the contractor. The site was selected because of its nearness to phosphate deposits, availability of electric power (from the Utah Power & Light Co.) and good rail transportation facilities.

Fast Tax Write-Offs

366 certificates
issued by DPA during
June 8-22nd
totaling $1,179,593,356
2,132 authorized to date
totaling $7,337,978,512

Latest DPA certificates listed by company, use, amount applied for, amount eligible, and pct approved.

Mississippi Power Co., electric power, $465,947, $461,007, 25.

Alabama Power Co., electric power, $24,153, 24,153, 65.

Pacific Power & Light Co., electric power, $26,450,000, $26,170,000, 75.

The Detroit Edison Co., electrical energy, $39,040,600, $39,040,600, 45.

The Detroit Edison Co., electrical energy, $20,448,550, $20,448,550, 65.

The Detroit Edison Co., electrical energy, $18,867,450, $18,867,450, 65.

The Detroit Edison Co., electrical energy, $42,798,750, $42,798,750, 25.

Virginia Electric and Power Co., electric power, $2,650,000, $2,650,000, 25.

Virginia Electric and Power Co., electric power, $3,000,000, $3,000,000, 25.

Virginia Electric and Power Co., electric power, $9,862,000, $9,200,000, 25.

Virginia Electric and Power Co., electric power, $2,965,000, $2,955,000, 25.

Virginia Electric and Power Co., electric power, $14,390,000, $13,600,000, 55.

Virginia Electric and Power Co., electric power, $2,200,000, $2,200,000, 55.

Virginia Electric and Power Co., electric power, $17,500,000 $17,100,000, 55.

Virginia Electric and Power Co., electric energy, $825,000, $823,000, 25.

Georgia Power Co., electric power, $12,143,673, $12,143,673, 50.

Alabama Power Co., electric power, $2,468,500, $2,468,500, 50.

Alabama Power Co., electric power, $306,695, $306,695, 50.

Alabama Power Co., electric power, $24,611,395, $24,611,395, 55/25.*

Gulf Power Co., electric power, $15,156,012, $15,156,012, 65/55.*

Gulf Power Co., electric power, $4,837,682, $4,819,682, 50.

Mississippi Power Co., electric power, $11,696,000, $11,696,000, 65/25.*

Georgia Power Co., electric power, $838,620, $838,620, 50/25.*

*("The cost of first unit with associated transmission lines and facilities certified at latter % as attributable to defense purposes.")

Georgia Power Co., electric power, $16,764,800, $15,286,800, 50.

Georgia Power Co., electric power, $7,748,277, $7,564,677, 50.

Alabama Power Co., electric power, $5,771,188, $5,765,202, 25.

Georgia Power Co., electric power, $1,460,000, $1,460,000, 25.

Georgia Power Co., electric power, $1,316,291, $1,316,291, 25.

Georgia Power Co., electric power, $1,255,544, $630,544, 25.

Bath Iron Works Corp., constructions of vessels (Navy), $850,000, $850,000, 75.

Russell, Burdsall & Ward Bolt and Nut Co., steel bolts and screws, $87,000, $87,000, 75.

St. Joseph Lead Co., lead and zinc, $5,671,600, $4,963,600, 60.

Shafer Bearing Corp., bearings, roller, $240,761, $240,761, 85.

General Electric Co., navy compass systems, $278,600, $278,600, 75.

Lukens Steel Co., steel plates, $4,453,228, $4,453,228, 70.

Edwin I. Guthman & Co., Inc., coils, $62,500, $57,825, 75.

The E. Horton & Son Co., lathe chucks—timing tool, $209,000, $209,000, 85.

The W. A. Hanna Co., iron ore, $85,750,000, $85,750,000, 75.

Athens Machine Co., tire molds, $57,500, $57,500, 80.

Eastern Brass & Copper Co., Inc., sheet strip metal, $286,434, $286,434, 60.

Republic Steel Corp., pig iron, $132,000, $132,000, 85.

CASE No. 419
Steel Products Plant
$21,000 saved yearly . . installation paid for itself in six months . . . congestion eliminated
(a) Savings in Effort (estimated) 15%
(b) Savings in Time (estimated) 20%
(c) Savings in Space (estimated) 20%
(d) Savings, too, in better employee relations
QUOTING CUSTOMER'S* STATEMENT:
"There is a direct saving on material handling of $1.20 per ton or $1,800 per month thus paying for the original investment in six months. Our Logan roller conveyor system handles about 1500 tons of 26 gauge sheet steel per month from warehouse to finished product. The warehouse crane places lifts of steel sheets on conveyor tables extending into warehouse from gang-slitters. These two to five ton piles are easily moved to slitters, are fed singly through slitter and are again piled on roller conveyors. A reasonable length of conveyor tables provides storage and eliminates frequent crane service. Piles of sheets are transferred to lead conveyors to production machines. Individual sheets are fed through machines and product piled upon pallets located on runout roller conveyor table where a number of piles may be moved along in temporary storage awaiting high lift transfer to shipping car or warehouse storage."
*Name on Request
THE KEY TO LOWER COSTS
Logan CONVEYOR
Saving in money . . . saving in time . . . saving in effort . . . saving in space . . . all accomplished by the installation of Logan Conveyors. You may find similar savings possible in your business. Write today for book, "Key to Lower Costs."
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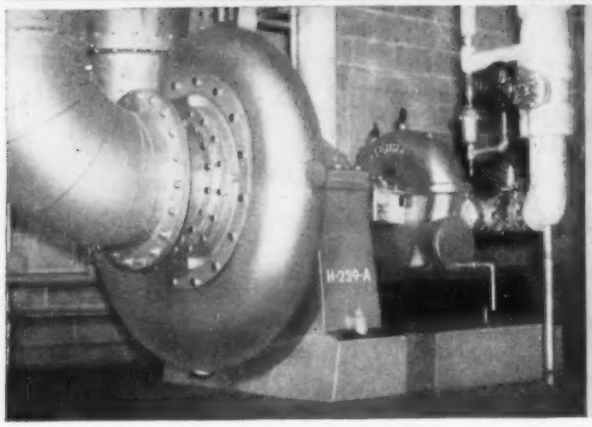
LOGAN CO., 545 CABEL ST., LOUISVILLE, KY.



CENTRIFUGAL

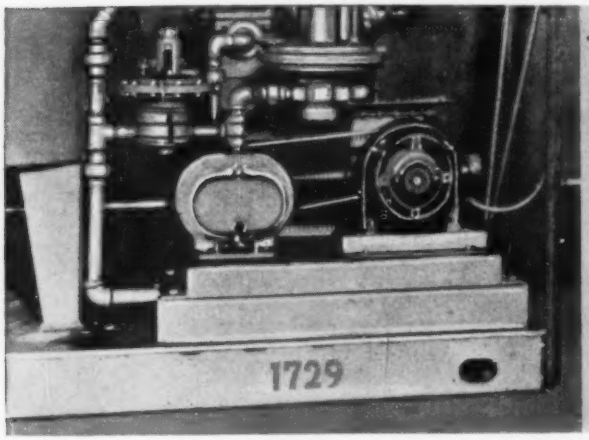
Type OiB Centrifugal Blower used for processing in a large eastern plant. Capacity 12,000 cfm. Similar R-C Blowers are utilized in other plants of this company.

The works manager of a large plant made this friendly statement to a Roots-Connersville representative. What he really meant was that R-C Blowers and related equipment perform so satisfactorily and dependably that they seldom need anything more than routine inspection by his own men.

In large and small plants, in every industry, R-C products uniformly give this kind of reliable operation. They continue to deliver rated capacities, year after year, with a minimum of maintenance—whether a small Rotary Positive Blower of 5 cfm capacity or a Centrifugal unit moving up to 100,000 cfm. And remember, only Roots-Connersville gives you this important dual-choice.

If you are planning a new plant, expansion, or replacements, R-C engineers will work with you to select the equipment best fitted to your needs. Almost a century of experience is at your service.

ROOTS-CONNERSVILLE BLOWER CORPORATION
510 Ohio Avenue, Connersville, Indiana



ROTARY

Small R-C Rotary Positive Gas Pump on auxiliary atmosphere control equipment for rotary hearth furnace.

ROOTS-CONNERSVILLE

BLOWER BUILDERS SINCE 1854

ONE OF THE DRESSER INDUSTRIES

Lundberg Mfg. Co., Inc., landing gear parts, $29,828, $29,828, 85.

Western Electrical Instrument Corp., course indicators, $556,193, $556,193, 80.

Shippers' Car Line Corp., transportation—rail, $761,379, $611,064, 80.

The Glenn L. Martin Co., aircraft, $178,727, $176,043, 80.

H. Klaff & Co., Inc., iron & steel scrap, $188,392, $188,392, 75.

Wisconsin Centrifugal Foundry, Inc., aluminum castings, $97,200, $85,400, 80.

Kelsey-Hayes Wheel Co., hub assemblies, $40,650, $40,650, 90.

Cogsdill Twist Drill Co., twist drills, $76,062, $76,062, 75.

Pittsburgh Forgings Co., steel forgings, $99,955, $99,955, 75.

Lockheed Aircraft Corp., aircraft, $1,392,917, $1,077,745, 80.

Lockheed Aircraft Service, Inc., maintenance of aircraft, $37,629, $37,629, 85.

The Locomotive Finished Material Co., diesel locomotive castings, $198,109, $182,130, 75.

Automotive Materials Corp., (Pilgrim Drawn Steel Div.), steel bars, wire, $141,300, $141,300, 60.

Ohio Ferro-Alloys Corp., ferrosilicon, ferrochrome, $67,132, $67,132, 85.

National Steel Corp. (Weirton Steel Co. Div.), steel ingots, $650,000, $650,000, 75.

National Steel Corp., steel ingots, $415,250, $415,250, 75.

Detroit Stamping Co., sheet metal stampings, $106,727, $66,324, 75.

Crawford Steel Foundry Co., steel castings, $22,016, $22,016, 75.

Republic Steel Corp., steel ingots, $253,045, $239,797, 70.

Magnetic Metals Co., nickel alloy, $566,205, $566,205, 75.

Republic Steel Corp., steel ingots, $180,000, $180,000, 75.

Republic Steel Corp., steel ingots, $285,000, $285,000, 75.

Russell, Burdsall & Ward Bolt & Nut Co., bolts and screws, $95,000, $95,000, 75.

Stewart-Warner Corp., Misc. warm air heating equipment, $103,562, $103,562, 85.

The Baltimore Steel Co., steel shipping containers, $221,462, $221,462, 80.

Thwing-Albert Instrument Co., measuring instruments, $11,157, $8,801, 90.

American Iron and Metals, Inc., non ferrous metals or briquettes scrap, $10,000, $10,000, 75.

Independent Lock Co., ordnance, $4,070, $4,070, 90.

A. & Blanche C. Seltz, The Marquette Steel Co., scrap iron, $22,615, $22,615, 75.

National Steel Corp. (Weirton Steel Co. Div.), steel sheets, $2,110,800, $2,110,800, 60.

Sharon Steel Corp., coal, $1,250,000, $1,250,000, 65.

Nevada-Massachusetts Co., tungsten ore concentrates, $125,000, $125,000, 60.

Blaw-Knox Co., aircraft, $240,000, $240,000, 75.

C. S. Walker Co., Inc., electromagnetic chucks, $113,267, $113,267, 85.

John A. Roebling's Sons Co., steel strip and wire, $335,000, $335,000, 60.

Central of Georgia Ry. Co., transportation—rail, $90,040, $62,040, 65.

The M. W. Kellogg Co., aircraft, $83,634, $71,782, 85.

North American Aviation, Inc., aircraft, $9,504,165, $6,508,495, 75.

John A. Roebling's Sons Co., steel wire, $234,700, $234,700, 60.

John A. Roebling's Sons Co., steel wire, $578,700, $578,700, 60.

Brown Co., conduit, $174,936, $174,936, 60.

U. S. Steel Co., iron and steel, $1,857,865, $1,746,990, 75.

U. S. Steel Co., iron and steel, $6,507,170, $6,483,870, 80.

U. S. Steel Co., iron and steel, $6,687,117, $6,466,617, 80.

The American Steel & Wire Co., pig iron, $719,158, $675,158, 65.

Consolidated Western Steel Corp., welded steel pipe, $626,428, $595,494, 60.

Consolidated Western Steel Corp., pipe and fabricating of steel, $3,012,634, $3,012,634, 60.

Altens Foundry and Machine Works, Inc., pumping units, Iso-flow furnaces, $173,150, $173,150, 75.

American Iron & Metals, Inc., scrap steel, $111,500, $111,500, 75.

Alpha Products, Inc., transformer cases, $4,174, $4,174, 75.

Standard Steel Treating Co., heat treating of tank parts, $31,754, $31,754, 80.

Standard Foundry Co., gray iron castings, $498,510, $498,510, 75.

*This amount is subject to revision after submission of details.

Magna Mfg. Co., Inc., magnesium and aluminum powders, $8,695, $8,695, 90.

Union Carbide and Carbon Corp., National Carbon Div., carbon and graphite electrodes, $16,400,000, $16,359,600, 75.

Great Lakes Carbon Corp., graphite electrodes, $183,000, $183,000, 75.

Brown Co., pipe fittings, $456,325, $456,325, 60.

Allied Chemical & Dye Corp., The Selvay Process Div., coke, $6,030,000, $6,030,000, 85.

Allied Chemical & Dye Corp., The Selvay Process Div., coke, $6,000,000, $6,000,000, 85.

Southern Scrap Material Co. Ltd., scrap iron and steel, $219,131, $219,131, 75.

C. K. Williams & Co., yellow iron oxide, $1,900,200, $1,900,200, 70.

Quaker Rubber Corp., aircraft, $256,198, $256,198, 75.

The National Cash Register Co., aircraft, $5,500,000, $5,000,000, 75.

Shuler Axle Co., truck axles, $12,626, $12,626, 90.

Lord Mfg. Co., aircraft, $29,030, $29,030, 90.

Hockett Engr. Co., steel scrap, $122,839, $122,839, 75.

Hockett Engr. Co., steel scrap, $399,641, $399,641, 75.

Solar Steel Corp., processing steel, $394,877, $394,877, 60.

King-Seeley Corp., aircraft, $400,000, $400,000, 75.

Lenkurt Electric Co., Inc., carrier equipment, $329,461, $329,461, 50.

Ivy H. Smith Co., wire mesh, $197,900, $197,900, 60.

Greenfield Tap & Die Corp., Geometric Tool Co. Div., chasers, $544,834, $533,323, 80.

The Colorado Fuel and Iron Corp., steel wire, $12,973, $12,973, 60.

The Colorado Fuel and Iron Corp., steel ingots, $11,712, $11,712, 75.

The Colorado Fuel and Iron Corp., wire, $100,000, $100,000, 60.

Atlantic Steel Co., steel ingots, $2,082,300, $2,000,300, 75.

United Iron & Metal Co., scrap iron, $60,000, $60,000, 75.

Lundberg Mfg. Co., Inc., aircraft landing, $61,906, $61,906, 90.

Southwest Steel Corp., steel scrap, $839,688, $839,688, 75.

Cutler-Hammer, Inc., aircraft, $7,775,927, $7,474,327, 75.

Bogart Mfg. Corp., testing equipment, $42,127, $42,127, 85.

The Canton Drop Forging & Mfg. Co., forgings—aircraft, $76,297, $68,867, 85.

The Studebaker Corp., aircraft, $3,758,390, $3,616,240, 75.

Tools, Inc., aircraft ordnance, $4,606, $4,606, 90.

McDonnell Aircraft Corp., airplane & aircraft parts, $666,302, $658,294, 75.

Sharon Steel Corp., pig iron, $501,000, $501,000, 85.

National Steel Corp. (Weirton Steel Co. Div.), steel sheets, $150,000, $150,000, 60.

Douglas Aircraft Co., Inc., airplanes, $1,164,000, $1,164,000, 75.

Nigg Engineering Corp., Covine, Calif., airplane flap tracks, $13,905, $13,905, 90.

Broderick & Bascom Rope Co., Seattle, wire rope, $40,256, $40,256, 60; $30,840, $30,840, 60.

Gold Foundry & Machine Works, Independence, steel castings, $20,634, $20,634, 75.

McDonnell Aircraft Corp., Robertson, Mo., airplanes, $143,153, $111,425, 75.

National Steel Corp., Weirton, W. Va., pig iron, $57,920, $57,920, 85.

Kearney & Trecker Corp., West Allis, Wis., milling machines, $1,263,140, $1,229,140, 75.

Goldsboro Iron & Metal Co., Goldsboro, N. C., steel scrap, $10,145, $10,145, 75.

The Ryan Aeronautical Co., San Diego, ordnance, $146,990, $84,163, 75.

Trent Tube Co., East Troy, Wis., stainless tubing, $838,056, $836,056, 60.

Watson Mfg. Co., Inc., Jamestown, N. Y., ordnance, $46,541, $46,541, 85.

Luris Engineering Corp., Bethlehem, metal buildings, $30,587, $22,457, 60.

Republic Steel Corp., Cleveland, steel ingots, $191,800, $115,000, 75.

National Steel Corp., Weirton, W. Va., steel ingots, $36,000, $36,000, 75.

Wyatt Metal & Boiler Works, Houston, metal shares & products, $223,027, $199,865, 60.

Wyatt Metal & Boiler Works, Dallas, metal shares & products, $37,968, $37,968, 60.

Broderick & Bascom Rope Co., St. Louis, wire rope, $29,528, $29,528, 60.

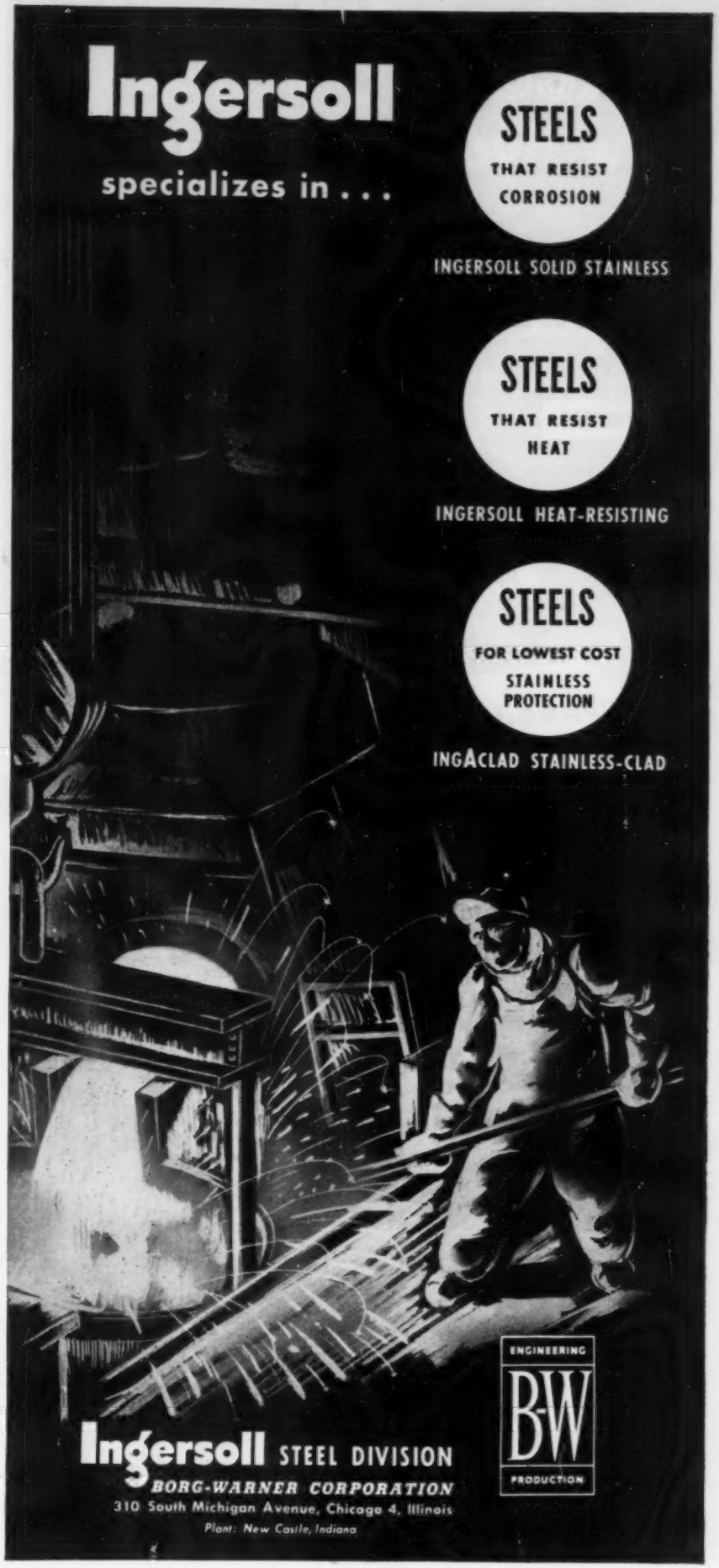
Wean Equipment Corp., Cleveland, wire mill machinery, $366,439, $366,439, 80.

Vickers, Inc., St. Louis, electric generators, $22,302, $22,302, 75.

St. Joseph Struct. Steel Co., St. Joseph, Mo., structural steel, $165,643, $29,440, 60.

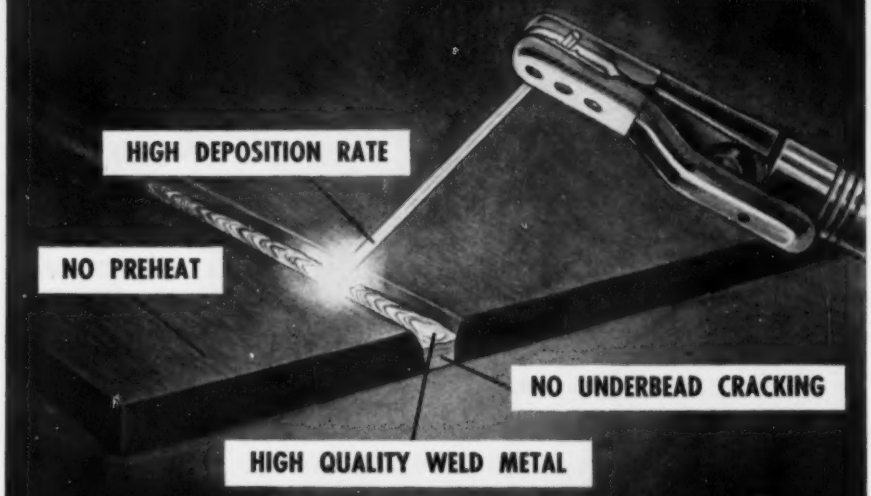
Borg-Warner Corp., Bellwood, Ill., metallic belt ordnance, $505,303, $482,803, 75.

The Budd Co., Philadelphia, ordnance, $41,-647, $41,647, 85.



ARCOS

Low Hydrogen Electrodes



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Save Critical Materials

Producing quality welds on high tensile fabrication jobs is essential today. Rewelds cost time and money. That's why it will pay you to depend on ARCOS—leader in the low hydrogen electrode field.

You get trouble-free, uniform welding performance because low hydrogen electrodes get the same rigid quality controls developed for the very critical requirements of Stainless. Arcos low hydrogen electrodes stay "factory fresh" because they are packaged and protected against moisture pick-up in the same careful way Arcos has always packaged its stainless electrodes.

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• News of Industry •

Crucible Steel Co. of America, Harrison, N. J., steel castings, $802,333, $802,333, 70.

Webster Spring Co., Webster, Mass., wire pallet adapters, $11,309, $11,309, 75.

Kaiser Aluminum & Chem. Corp., Mead, Wash., aluminum pig, $12,789,750, $12,789,750, 80.

Reynolds Metal Co., Longview, Wash., aluminum pig, $9,999,000, $9,999,000, 80.

A. Blumberg & Bro., Philadelphia, steel scrap, $99,000, $74,500, 75.

Alan Wood Steel Co., Conshohocken, Pa., steel ingots, $3,915,000, $3,598,800, 70.

Southworth Machine Co., Portland, Maine, airplane parts, $43,122, $43,122, 90.

The Dow Chemical Co., Freeport, Texas, magnesium ingots, $3,200,000, $3,200,000, 50.

Youngstown Sheet & Tube Co., Indiana Harbor, steel ingots, $1,164,000, $1,164,000, 75.

Younstown Sheet & Tube Co., Youngstown, steel pipe & wire, $1,644,170, $1,644,170, 75.

Ajax Electrothermic Corp., Trenton, N. J., electric induction furnaces, $105,000, $105,000, 75.

The Colorado Fuel Iron Corp., Pueblo, Col., steel ingots, pig iron, $1,729,500, $1,691,650, 75.

C. L. Maguire, Wickenburg, Ariz., copper ores, $220,665, $74,500, 75.

Sharon Steel Corp., Farrel, Pa., steel ingots, $7,731,043, $6,263,899, 65.

The Aetna-Standard Engr. Co., Ellwood City, Pa., ordnance, $3,155,512, $3,153,712, 75.

Bart Laboratories Co., Inc., Belleville, N. J., airplane parts, $8,454, $8,454, 75.

The Dow Chemical Co., Freeport, Texas, magnesium ingots, $130,000, $130,000, 50; magnesium metal ingots, $330,000, $330,000, 50.

Harry Goldberg & Sons, Perth Amboy, N. J., iron & steel scrap, $42,020, $42,020, 75.

National Steel Corp., Weirton, W. Va., pig iron, $90,500, $90,500, 75.

Douglas Aircraft Co., Inc., Santa Monica, Calif., airplanes, $96,695, $61,367, 75.

Samuel G. Keywell Co., Inc., Detroit, scrap metals, $333,639, $333,639, 75; $620,000, $620,000, 75.

Ford Motor Co., Dearborn, coke and pig iron, $43,482,000, $42,161,000, 70.

Allegheny Ludlum Steel Corp., Ferndale, Mich., carmet tipped tools, $385,000, $385,000, 75.

Union Wire Rope Corp., Kansas City, wire and wire rope, $1,364,460, $1,160,560, 60.

The Atchison, Topeka & Santa Fe RR Co., Chicago, transportation-rail, $33,850,000, $35,275,000, 80.

American Shim Steel Co., New Kensington, Pa., strip steel, $321,000, $321,000, 60.

Firth Sterling Steel & Carbide Corp., McKeesport, Pa., special alloy steel, $237,276, $214,294, 70.

John A. Roebling's Sons Co., Roebling, N. J., steel wire, $230,810, $230,810, 60.

United States Steel Co., Vandergrift, Pa., steel, $514,280, $514,280, 75.

United States Steel Co., Dravesburg, Pa., sheet steel, $3,327,573, $3,327,573, 60.

United States Steel Co., Youngstown, steel, $10,087,059, $10,087,059, 80.

Appalachian Elec. Power Co., c/o Am. Gas & Elec. Serv. Corp., Glen Lyn, Salem & Roanoke, Va., electric energy, $2,743,240, $2,743,240, 25.

Appalachian Elec. Power Co., c/o Am. Gas & Elec. Serv. Corp., From Kingsport, Tenn. to Boone Dam, Tenn., electric energy, $212,300, $212,300, 25.

The Ohio Power Co., c/o Am. Gas & Elec. Serv. Corp., From Relief to Lima, Ohio, electric energy, $12,089,925, $12,074,925, 65.

Indiana & Michigan Elec. Co., c/o Am. Gas and Elec. Serv. Corp., South Bend, electric energy, $661,179, $661,179, 25.

Indiana & Michigan Elec. Co., New York, electric power, $21,034,840, $20,928,340, 25; $17,468,691, $17,468,691, 45; $1,753,840, $1,748,840, 45.

Appalachian Elec. Power Co., New York, electric power, $16,210,450, $16,210,450, 25; $47,939,310, $47,939,310, 65/45; $1,873,700, $1,873,700, 45; $774,030, $774,030, 25.

The Ohio Power Co., New York, electric power, $19,197,630, $19,197,630, 25; $55,608,275, $55,534,275, 65; $4,652,450, $4,639,950, 45.

Chrysler Corp., Detroit, welding sub-assemblies, $36,372, $36,372, 75.

Racine Tool & Machine Co., Racine, Wis., hydraulic pumps, $240,959, $240,959, 80.

Cagnon Plating & Mfg. Co., Colorado Springs, aircraft, $1,875, $1,875, 75.

Pennsylvania Saw Corp., Newark, saws, $93,582, $83,882, 80.

Texas Bolt & Supply Co., Houston, nuts, $223,815, $223,815, 75.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., ferrous & non-ferrous nuts, $246,683, $246,683, 75.

Sealmaster Coil Spring Corp., Los Angeles, springs, wire forms, $71,085, $71,085, 75.

The Dow Chemical Co., Midland, Mich., magnesium ingots, $2,138,000, $2,138,000, 50.

Johnson Coke Co., Chattanooga, coke, $210,160, $210,160, 90.

K & M Products, Inc., Merchantville, N. J., arc-welding studs, $201,172, $165,422, 80.

Moloutn Steel Corp., Trenton, Mich., pig iron, steel ingots, $96,629,000, $95,629,000, 70.

Sharon Steel Corp., Lowellville, Ohio, steel billets, $726,930, $140,800, 75.

Crucible Steel Co. of America, New York, N. Y., steel ingots, $3,579,006, $2,393,435, 65.

United States Steel Co., Pittsburgh, iron and steel, $10,616,819, $10,456,819, 80; steel billets, $21,029,354, $20,816,047, 75; sheet steel, $10,637,156, $10,471,260, 60.

National Tube Co., Pittsburgh, steel tubes and steel bars, $1,923,200, $1,923,200, 60.

Consolidated Western Steel Corp., Los Angeles, fabricated structural steel, $10,800, $10,800, 60.

Wm. Mervis & Sons, Kokomo, Ind., scrap sheet iron, $35,000, $35,000, 75.

Kramer Orloff Co., Hamtramck, Mich., scrap iron, $53,265, $53,265, 75.

Morris Bean & Co., Yellow Springs, Ohio, aircraft, $839,052, $669,138, 75.

United States Hammered Piston Ring Co., Stirling, N. J., oil seal rings, $8,015, $8,015, 85.

The Eastern Malleable Iron Co., Wilmington, malleable iron castings, $15,000, $15,000, 75.

United Smelting & Aluminum Co., Inc., New Haven, aluminum sheet, $13,055,000, $12,905,000, 60.

Southwest Steel Corp., Kansas City, scrap iron, $30,751, $30,751, 75.

Evans Tool & Die Co., Detroit, machining & boring, $56,759, $56,759, 80.

Standard Steel Spring Co., Coraopolis, Pa., armor plate, $15,000, $15,000, 75.

G. Philip Stout T.A Industrial Research Laboratories, Baltimore, research & dev., $75,000, $56,945, 80.

Electric Steel Foundry, Portland, alloy castings, $358,870, $358,870, 75.

Schiller-Pfeiffer Machine Works, Philadelphia, base plugs, $12,420, $12,420, 90.

Armet Alloys, Inc., Cleveland, magnesium alloy ingot, $50,240, $43,740, 75.

Baldwin-Lima-Hamilton Corp., Hamilton, Ohio, gray iron castings, $335,200, $335,200, 75.

Douglas Aircraft Co., Inc., Santa Monica, airplanes, $794,227, $755,730, 75.

The Tool Steel Gear & Pinion Co., Cincinnati, screws, axles, rolls, gears, $1,427,787, $1,347,787, 80; $72,408, $72,408, 80.

The Watson-Stillman Co., Roselle, N. J., forged steel fittings, $418,000, $418,000, 75.

Shein's Express, Jersey City, N. J., motor carriers, $325,000, $275,000, 70.

The Timken Roller Bearing Co., Canton, Ohio, steel tubing, $1,450,000, $1,450,000, 60.

W. F. Wimmer Co., Pittsburgh, scrap iron, $273,819, $273,819, 75.

Sangamo Eliectric Co., Springfield, Ill., sonar equipment, $125,505, $125,505, 85.

J. W. Rex Co., Lansdale, Pa., metal conditioning, $69,372, $61,884, 60.

Columbia Steel Co., Pittsburgh, Calif., cold rolled strip, $22,685,830, $17,978,830, 60.

General Brass & Machine Works Inc., Hillside, N. J., aircraft, $52,628, $52,628, 75.

Ex-Cell-O Corp., Fostoria, Ohio, aircraft, $1,688,642, $1,684,642, 75.

Airquipment Co., Burbank, Calif., aircraft equipment, $92,897, $68,583, 80.

The Goodyear Tire & Rubber Co., Akron, aircraft, $56,080, $56,080, 75.

Crawford Door Co., Detroit, aircraft, $286,000, $256,019, 75.

The Ohio Knife Co., Cincinnati, tool steel trays, $887,018, $887,018, 80.

Fuller Mfg. Co., Milwaukee, steel forgings, $100,780, $50,821, 75.

Janney Machine Corp., Philadelphia, bazooka bodies, $9,306, $6,376, 85.

Blaw-Knox Co., Pittsburgh, cast steel, $1,-[illegible],500, $1,146,000, 75.

Joseph L. Foarer, dba American Standard Products Co., Hartford, bolts, nuts, $17,130, $17,130, 75.

Wm. R. Whittaker Co., Ltd., Los Angeles, check valves, $70,149, $41,213, 85.

Standard Steel Spring Co., Gary, springs for vehicles, $60,860, $60,860, 75.

Rockville Products, Oceanside, N. Y., machine parts, $5,596, $5,596, 75.

Specialloy, Inc., Chicago, alloy addition agents from scrap, $71,935, $71,935, 75.

Jones Iron & Metal Co., Dearborn, steel scrap, $95,820, $95,820, 75.

The Wilkoff Co., Youngstown, steel scrap, $308,600, $308,600, 75.

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We must produce vast quantities of the best possible weapons of war at the earliest possible time. In planning and producing such weapons, remember the time-saving and cost-reducing possibilities of the use of Michigan electric resistance welded steel tubing.

Michigan tubing, because of qualities such as adaptability and design simplification it offers, was used in the manufacture of numerous products for defense in World War II, in straight lengths and fabricated, for automobiles, trucks, invasion line tubing, etc.

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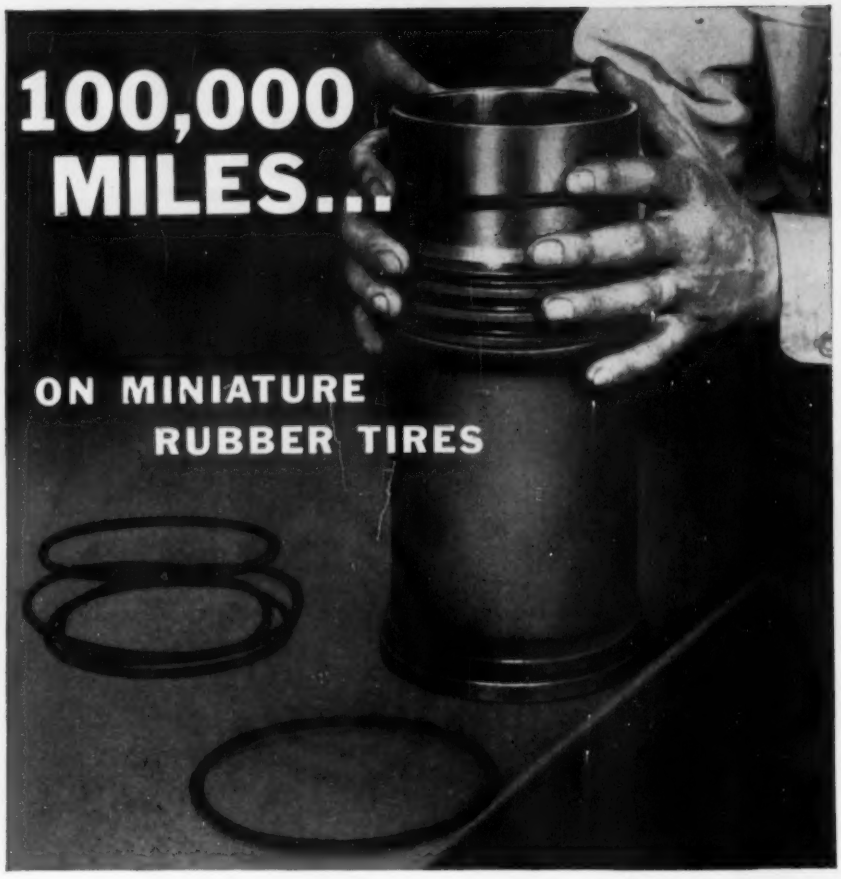

Photograph courtesy of
Cummins Engine Company, Inc., Columbus, Indiana

Tire-shaped rubber packing rings for cylinder liners in Cummins diesel engines are small but important. They provide a seal between oil and water—a seal that must be perfect whether the engine is cold or operating at high temperatures. Moreover, these rubber rings must stand up for at least the equivalent of 100,000 miles of operation.

These severe operating requirements presented a rubber problem with exacting specifications: resistance to sustained heat—controlled swell in oil—exceptional compression quality—precision tolerances.

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Cincinnati, Ohio	Indianapolis, Ind.	Philadelphia, Pa.	Syracuse, N. Y.

Third Phase of Modernization Announced by Dominion Steel Corp.

Dominion Steel & Coal Corp. will proceed with the third phase of its modernization and expansion program, representing an expenditure of $16 million, president L. A. Forsyth announced. The work will include construction of a new battery of coke ovens, two new openhearth furnaces, a new high carbon wire drawing plant, new machine shop and alterations to existing equipment.

Enlargements and improvements at the Sydney, N. S., steel works of the company will permit annual production of 720,000 tons of ingot steel and the processing to finished products.

Mining Equipment

The first stage of the company's expansion program includes provision for mechanized mining equipment and wash plants at the coal properties which supply coal for the Sydney steel works. A comprehensive project for increasing production at the iron ore mines at Wabana, Newfoundland.

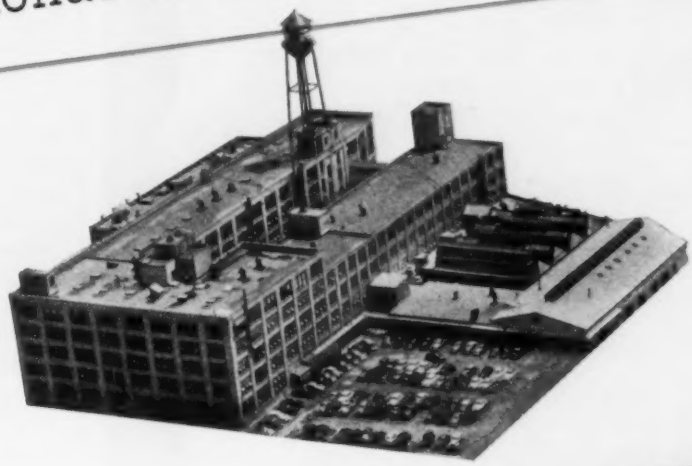
The second stage of the program was construction of the first battery of coke ovens now in operation, and electrification and modernization of the blooming mill and auxiliary facilities which are expected to be completed by the end of 1952.

New Million Dollar Plant Will Triple Parts Production

A new plant which will cost $1 million is to be built by Precision Sheet Metal, Inc. in the Los Angeles International Airport industrial tract which will triple the company's facilities for producing aircraft parts now operating in Culver City, Calif.

Lear, Inc., manufacturers of civilian and military radio and electronic equipment, is moving all its radio production machines from Grand Rapids, Mich. to Los Angeles where it has an option on 12 acres on which the company expects to erect a 40,000 sq ft facto-

Rx Take your Casting, Finishing and Assembly problems to Monarch Aluminum Mfg. Company



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more scrap means more steel!

AN OPEN LETTER
TO THE MANUFACTURERS AND USERS
OF STEEL PRODUCTS

I am sure Mark Twain had more than the weather in mind when he wrote his immortal lines about people talking but doing nothing about it.

It hits right at home with people like you and me in the Steel business. We're talking about SCRAP today but nobody seems to be doing enough about getting it back to the furnaces.

Undoubtedly, there are thousands of tons of SCRAP METAL in our manufacturing plants that could help to make our defense weapons and ease our unquenchable thirst for steel.

If each of us, as individuals, would spearhead a company-wide survey I am sure we would uncover tons of valuable SCRAP METAL. Seven carloads were recently repossessed in a survey of a moderate sized plant.

The government shouldn't have to tell us to reclaim SCRAP METAL. The situation is critical enough NOW for all of us to comb our plants and return all SCRAP to our suppliers. MORE SCRAP MEANS MORE STEEL, it's as simple as that. So let's survey our plants and get an industry-wide, concerted SCRAP drive started.

Sincerely yours,

M. A. Follansbee
President

FOLLANSBEE STEEL CORPORATION
GENERAL OFFICES, PITTSBURGH 30, PA.

U.S. and Canadian Furnaces Use More Lake Iron Ore in May

Consumption of Lake Superior district iron ore by U. S. and Canadian blast furnaces rose to 7,761,173 gross tons in May, compared with 7,235,243 gross tons in April and 7,388,143 gross tons in May, a year ago, the Lake Superior Iron Ore Assn. reported recently.

Cumulative consumption at the end of May was 36,129,853 gross tons as compared with 32,596,890 gross tons in the corresponding period of 1950.

Stocks of iron ore on hand at docks and furnace yards totaled 19,771,719 June 1, as compared with 15,071,767 a month ago and 14,384,443 a year ago, the association reported.

Active blast furnaces depending principally on Lake Superior district iron ore totaled 180 in the U. S. and nine in Canada.

Open New Tin Research Institute

New laboratories of the Tin Research Institute at Greenford, England, were officially opened recently. Research already completed includes a process for the electro-deposition of a tin-nickel alloy.

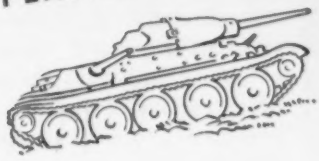
A method of determining the degree of adhesion of lacquers or paints to tinplate or other surfaces has also been devised. The painted tinplate is scratched, subjected to artificial sea-water corrosion, and the deterioration of paint near the scratches is then assessed.

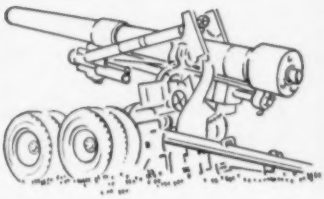
Iron Recovery from Shale

A contract for the design and construction of a demonstration plant for continuous recovery of oil from shale has been awarded the Chemical Plants Div. of Blaw-Knox Co., Pittsburgh, by the U. S. Bureau of Mines.

The contract calls for construction of a plant at Rifle, Colo., for the processing of 150 to 400 tons of oil shale daily. The plant will use a promising "gas-combustion" retorting process developed by the Bureau at Rifle.

ARMAMENT COMPONENTS FOR TANKS • SHIPS PLANES • GUNS





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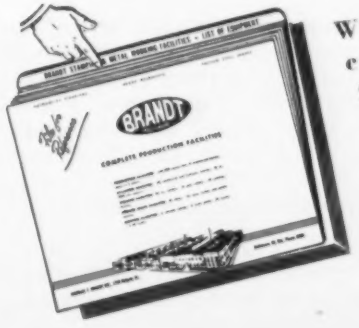

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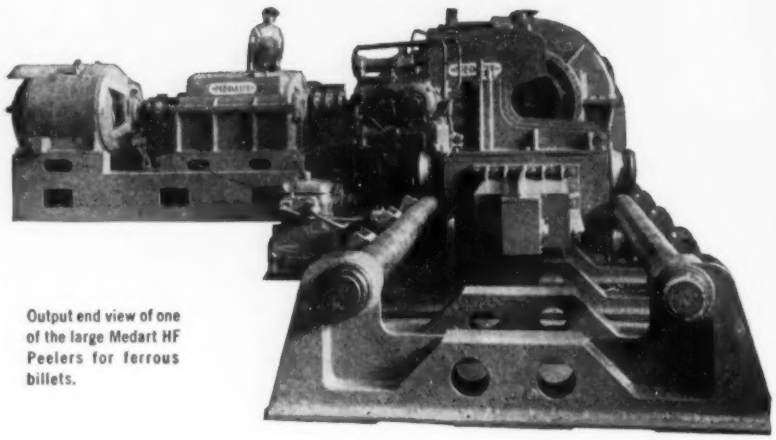

Output end view of one of the large Medart HF Peelers for ferrous billets.

The output of Medart Billet Peelers is limited only by the capacity of the best available cutting tools! That means the absolute maximum in production at the lowest possible cost!

Built to handle both ferrous billets from 1" to 14" diameter—as well as brass, copper, aluminum and other non-ferrous metals—the throughput speeds of these Medart Peelers range from 1' to 40' per minute, depending upon workpiece size and material. They can be equipped with either one or two cutterheads—arranged for high surface finish or heaviest hogging cuts—and furnished with hydraulic or pneumatic controls, with push-pull feed devices, and for completely automatic operation.

No other scalping or turning machines made can match the production speed or economy of Medart's complete line of Billet Peelers.

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Need for Corrective Measures To Improve New England Industry

Area businessmen agree on methods at N. E. Council quarterly meeting

Industrial firms of New England must take corrective measures in order to maintain and improve its competitive position, a panel of six businessmen agreed at the 103rd quarterly meeting of the New England Council at Manchester, Vermont.

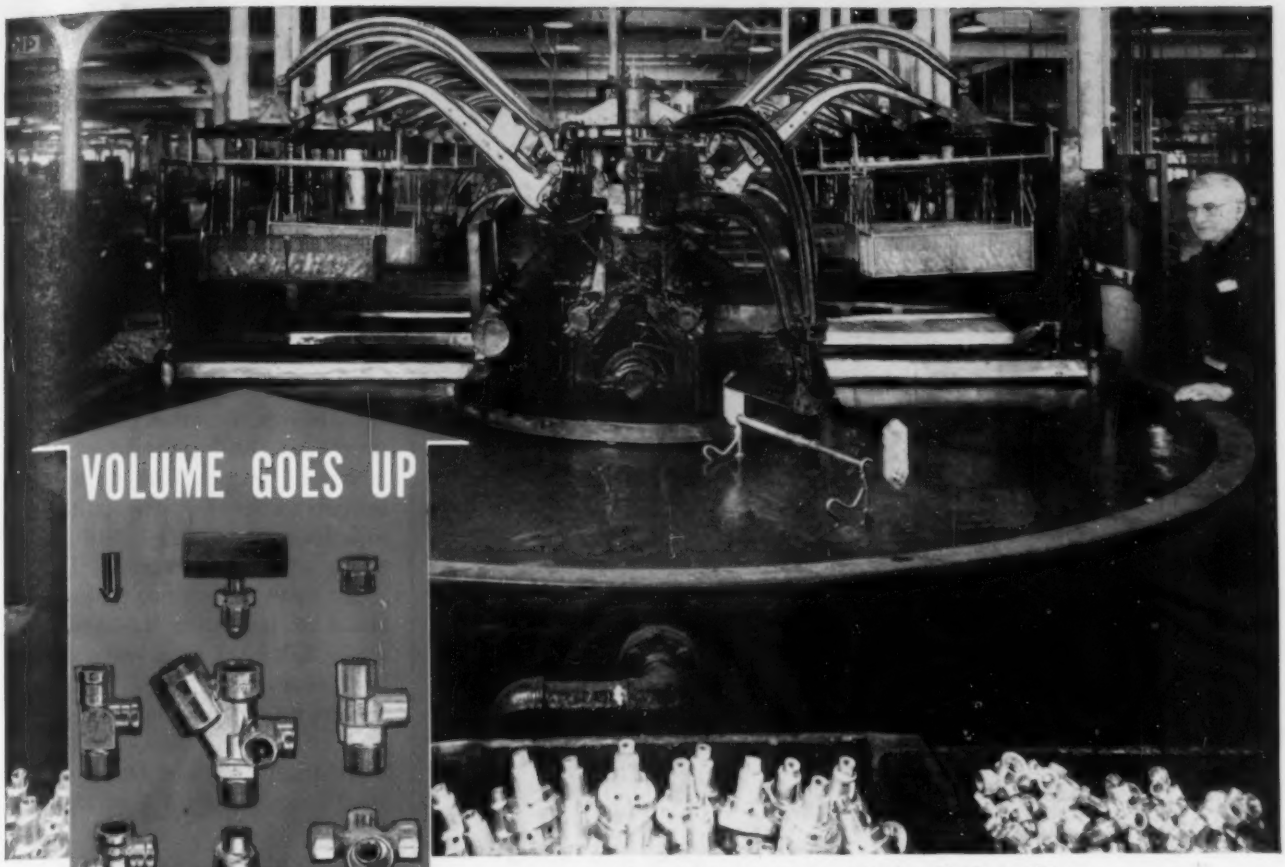
Conflicting attitudes of labor and management, improvements of plants and methods are in need of corrective measures. One businessman added that means must also be found for combatting the barrage of invitations to New England industry to locate elsewhere with many "give-away" inducements.

The Council's panel was moderated by Prof. Erwin H. Schell, head of the department of engineering and business administration at Massachusetts Institute of Technology. He urged firms to use accelerated amortization or fast tax write-off. He also said that unless New England gets a genuine, region-wide plant modernization program into action within the next 2 years, the region will emerge from the defense period with its industry outmoded and out-stripped.

Smoke Recovery Units Pay Off

Recovery of smoke may result in pay dirt when using the Du Pont Company's new "Orlon" acrylic fiber soot-collecting bags. According to Du Pont, successful use of dust collectors has been reported by producers of metals. In one installation "Orlon" is used in one of the firm's roasting processes. The wastes funneled through the bags contain sulfur, zinc, lead, and cadmium.

One manufacturer reports these bag-filler units stand up well under high temperatures and when subjected to various gases. Many users also claim great resistance to mineral acids, a fair resistance to weak alkalies, and the fact that the new material is not harmed by common solvents, oils, greases, neutral and most acid salts.



Stevens Full Automatic at Bastian Blessing's Chicago plant used for processing valve parts shown in inset.

When a Stevens Automatic Goes To Work . . .

Look at the results reported by The Bastian Blessing Company of Chicago, after installing a Stevens Special Full Automatic Bright Dipping Machine!

E. N. Krein, vice president, says: "Although our Stevens Machine has been in operation only three months, it has demonstrated its advantages in so many ways that *we wish to confirm the claims made by Stevens about this equipment!* Parts sent through this machine without prior cleaning come out *dependably and uniformly bright and free from grease, dirt and chips.* We have *increased our volume and reduced our unit costs* on our bright dipping operations. The installation is doing a big job in this day of labor shortages and it is doing it without the fumes and personal protective equipment of the past. Our records show that the workmen appear quite pleased and it looks like we will have less labor turnover in this work."

There you have the word of a satisfied customer —the best endorsement of all. Why don't you let your Stevens representative show you how Stevens equipment can bring new profit and economy to *your* operations? Call him today or write direct to *Frederic B. Stevens, Inc., Detroit 16, Michigan,* for complete information. There's no obligation.

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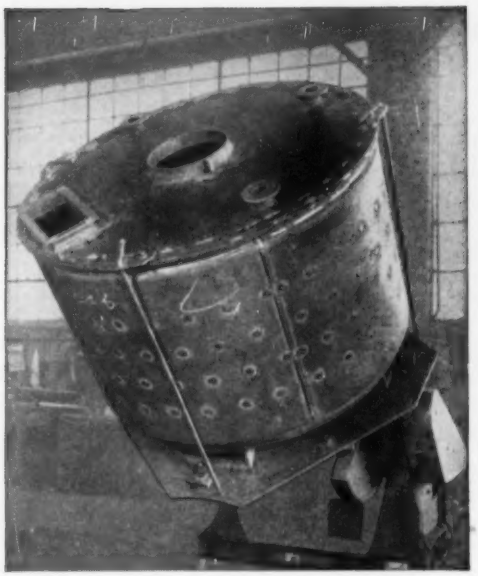

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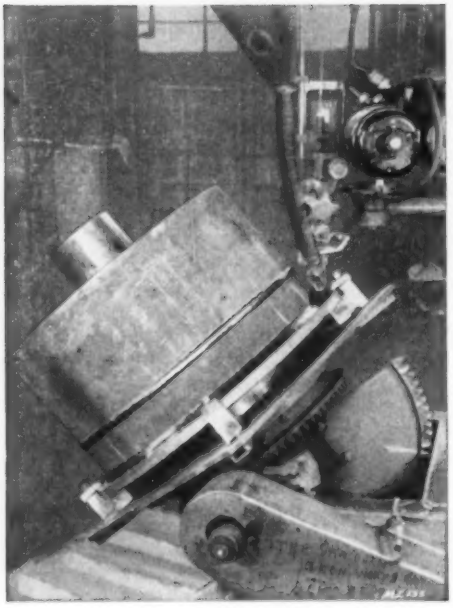

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Laud Steel Industry's Ability To Produce Still Short Line Pipe

The steel industry's ability to produce line pipe was lauded recently by the Gas Appliance Manufacturers Assn. which indicated that the industry more than trebled its capacity since 1946 to meet the demand for line pipe. Frederic Hess, president of the association, reported that despite increases the supply of pipe this year will only total about half the industry's needs. He said many pipe lines are being held back because of the shortage.

In 1946 the line pipe output stood at less than 1,000,000 tons while 3,668,511 tons were shipped last year. Line pipe production was 2 pct of the 1946 steel shipments and in 1950 represented more than 5 pct of the expanded steel capacity.

Sets '52 Building at 80 Pct of '50

Total physical volume of 1952 new construction will run about 80 pct of the 1950 level, predicted Defense Mobilizer Charles E. Wilson. The estimate was prompted by a request from the Chamber of Commerce of the United States in order that the construction industry would have some basis for planning.

Mr. Wilson's forecast covers all types of construction and in some cases, such as public, industrial and military, his estimates of volume top 1950. He expects public utilities to maintain last year's rate but housing will drop well under 1950 but still cling to 1951 levels.

He also believes that by cutting critical materials used in construction, more building can be encouraged.

Vacuum Cleaner Sales Dip

Factory sales of standard size household vacuum cleaners dropped to 201,983 units in May, a decrease of 11.1 pct from April and 27.5 pct from May, 1950. May was the fourth consecutive month to show a decrease from the comparison period of last year.

Ship ahoy

IT'S ALUMINUM ALLOY!

Aluminum alloys resist corrosion by sea water—they avoid troubles from warping, rusting or rotting. But that's only one reason aluminum is widely used in the construction of watercraft. Every vessel from a small boat to a big ship benefits from aluminum's light weight. For example, when you reduce the weight of a ship's funnels, deckhouses, or other superstructure, you increase the ship's stability. Then too, as with all forms of transportation, wherever you reduce dead weight, you can carry more people or cargo. Aluminum's lightness also makes it easier, hence cheaper, to handle sections and subassemblies in the shipyard. Still another reason for using aluminum on ships is that it is nonmagnetic—it does not distort compass readings.

Aircraft and landcraft as well benefit with aluminum. Aluminum makes them easier to build... lighter . . . longer-lasting . . . lower-cost to operate and to maintain.

Because aluminum has so many desirable properties, it's in great demand for thousands of every day uses. But it's in even greater demand for transportation, military, and other essential needs. Besides supplying millions of pounds of aluminum for security, we're doing our utmost to relieve the shortage of aluminum for all your needs.

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PAGE STEEL AND WIRE DIVISION
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Elmes in 100th Year

Cincinnati—Elmes Engineering organization, now the Elmes Engineering Div. of American Steel Foundries, marks its 100th anniversary this year. It has won a century of respect from industry the world over.

The business was founded in 1851 by Carleton D. Elmes. Housed in a small building in Bath, Maine, the first shop did job work machining, primarily for the marine industry. In 1861 the firm moved to Chicago where Charles F. Elmes joined his father and gave the firm a new name, Elmes & Son.

After Elmes entered the field of hydraulic equipment and saw new buildings erected on its Chicago site, the Charles F. Elmes Engineering Works was purchased by the American Steel Foundries in 1943. In 1949 the firm moved to Cincinnati to a large modern plant.

Partners in Titanium Research

Development of a better process to produce titanium is the goal of a partnership in research between Monsanto Chemical Co., St. Louis, and National Research Corp., Cambridge, Mass. Both firms will enlarge their research projects under the new agreement.

Dr. Robert A. Stauffer, technical director of National Research, and Dr. N. N. T. Samaras, director of Monsanto's Chemical Research Dept., will be in charge of the program. Heavier demand for the metal is apparent, the firms announced.

Inland Yards Built 88 Ships in '51

The 88 vessels built by inland shipyards during the first 4 months of this year are estimated by American Waterways Operators, Inc., to be a fourth of total launchings. Included were 7 tugboats, 7 towboats, 29 hopper barges, 6 cargo barges, 20 oil barges, 7 covered cargo barges, 1 spud barge, 8 covered hopper barges, 1 acid barge, 1 wharf boat and 1 auto-trailer barge.

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★ Greater Dependability

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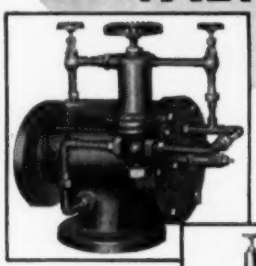
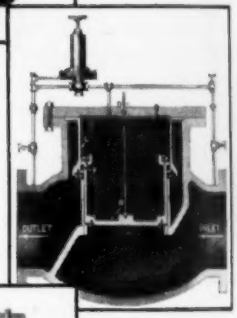
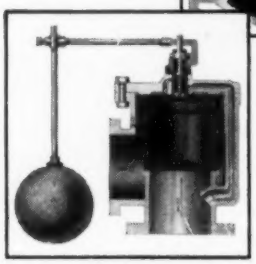


G-A Surge Relief Valve. Bulletin W-2 sent on request.



G-A Water Pressure Reducing Valve. Bulletin W-3 contains the technical information you want.



G-A Cold Water Float Valve. Bulletin W-5 will be of interest to you.

The patented air and water double cushioning feature inherent in all G-A Valves prevents any slam or hammer.

Let our reputable engineers help you with your water control problems.

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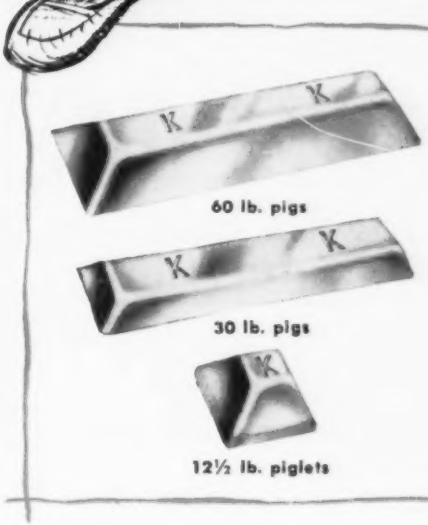
KEOKUK
ELECTRO-SILVERY



KEOKUK ELECTRO-METALS COMPANY

Keokuk, Iowa • Wenatchee Division: Wenatchee, Washington

SALES AGENTS: **Miller and Company**

332 S. Michigan Avenue, Chicago 4, Ill. • 3504 Carew Tower, Cincinnati 2, Ohio • 407 N. Eighth Street, St. Louis 1, Missouri

DIESEL-ELECTRIC

Ready-Power model RD9DX Diesel-electric provides amazingly low cost power for this 60,000 lb. Automatic Skylift Giant. Other Ready-Power Diesel models are available for electric trucks of 6,000 lb. to 80,000 lb. capacity.

or GAS-ELECTRIC

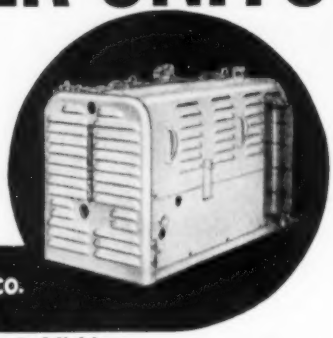
Equipped with the new Ready-Power gas-electric model H-A, this Lewis-Shepard fork truck can be operated 24 hours a day at peak efficiency. There are gas-electric models for all makes and types of electric trucks.

READY-POWER UNITS

FOR LOW COST,

CONTINUOUS DUTY

ELECTRIC TRUCK OPERATION



THE READY-POWER CO.

3822 Grand River Ave., Detroit 8, Michigan

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

Republic Sets Repair Record Of Blast Furnace at Youngstown

Republic Steel Corp.'s Youngstown No. 1 blast furnace is back in production after a 47-day shutdown for relining and installation of high-pressure blowing equipment. The 47-day rebuilding period is a new record for repairs of such an extent at the Youngstown plant.

The job included complete relining of the No. 1 stack, a new carbon hearth, the installation of blowing equipment, and repairs to stoves and stock houses.

Ultimately, the daily pig iron production of this furnace should increase from its original 1120 net tons rated capacity to approximately 1300 net tons, according to Republic's Youngstown district manager John H. Graft.

Deny Export License Privileges

Yangtze Trading Corp., of New York, has been denied export license privileges for 3 years. The order applies to all officials and stockholders of the firm and any other person or firm with which they are connected.

Office of International Trade charges improper use of export licenses and irregularities in tinplate shipments to China.

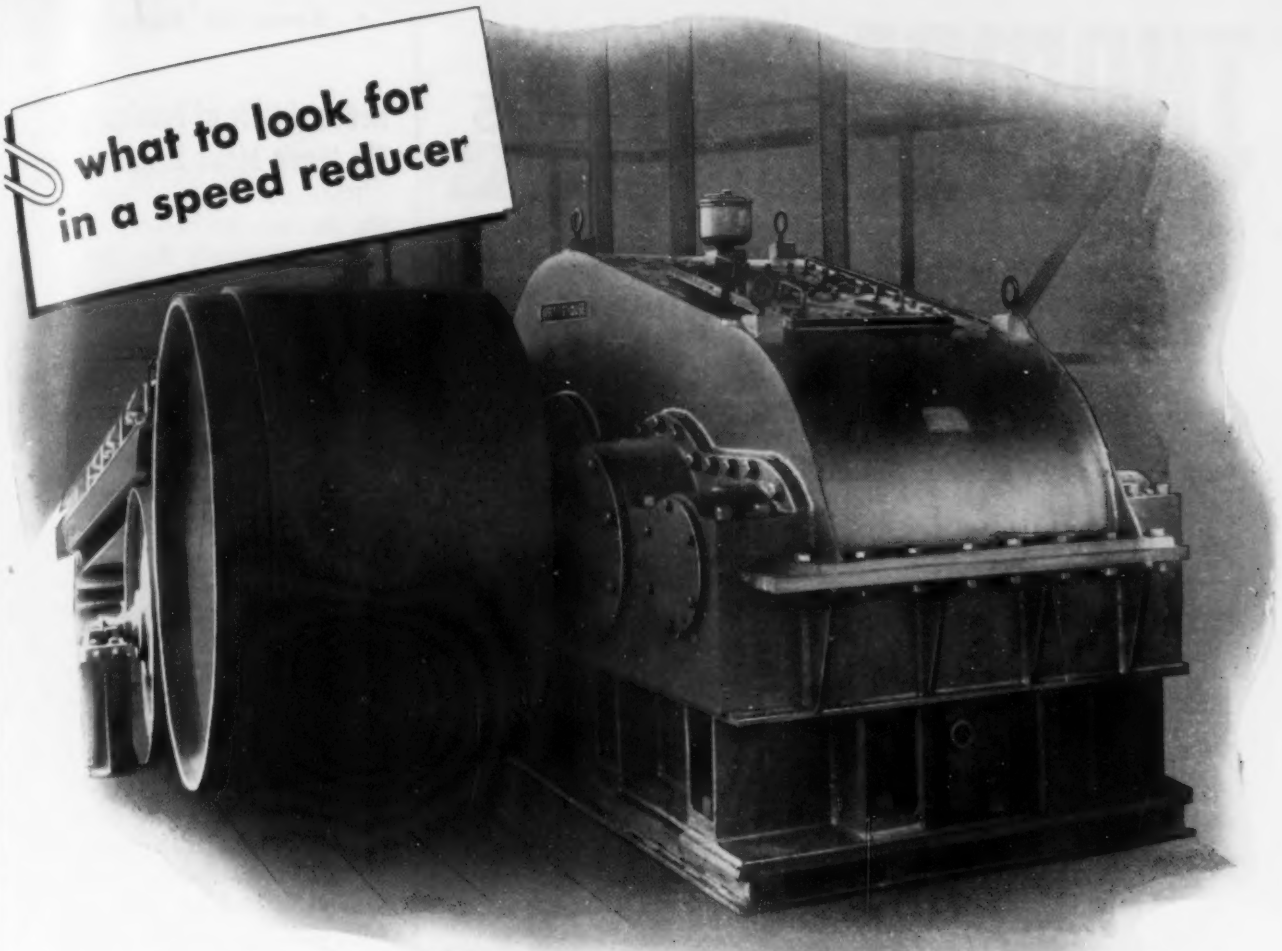
Award Two Pipeline Contracts

A contract for the construction of 76 miles of 30-in. pipeline from the Tennessee River to a point near Columbia, Tenn., has been awarded the Eastern Pipe Line Contractors, of Dallas, Tex., by Texas Eastern Transmission Corp.

H. B. Zachry, of San Antonio, Tex., will start a 74-mile pipeline from a point near Columbia to the Cumberland River in Tennessee.

Armco Trend to Common Stock

All but approximately 8900 shares of Armco Steel Corp.'s 4½ pct cumulative preferred stock has been converted to Armco common as compared to 122,000 shares outstanding Apr. 30 when the preferred was called for redemption as of June 14.



look for *A STRONG TIGHT CASE*

National Iron Company did . . . and saved $8,000 with this Westinghouse Speed Reducer installation

The National Iron Company of Duluth, Minnesota, recently conceived a new idea for a conveyor belt drive—overhang the head pulley directly on the speed reducer. A total savings of $8,000 in equipment and installation time was made on this first iron-range application.

Materializing the idea was simple. Selecting a speed reducer that could stand the strain wasn't. The overhung load was 28,800 pounds! A Westinghouse Type-WDH Speed Reducer with its rugged case construction was the answer.

Type-WDH Speed Reducer case is heavily ribbed to provide extra strength at points of greatest stress. Horizontal split construction provides easy accessibility without disturbing the mounting or motor.

You get greater capacity and service life with Westinghouse Speed Reducers because they have:

Taper-hardened helical gears for high efficiency and smooth quiet operation.

Roller bearings for permanent shaft alignment and minimum friction loss.

A simple splash-type oil system for positive and ample lubrication.

Write today for the complete details as presented in bulletin DB-3700 SR. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

J-07298

YOU CAN BE SURE.. IF IT'S

Westinghouse

MEMBER OF AGMA

GEARED DRIVES

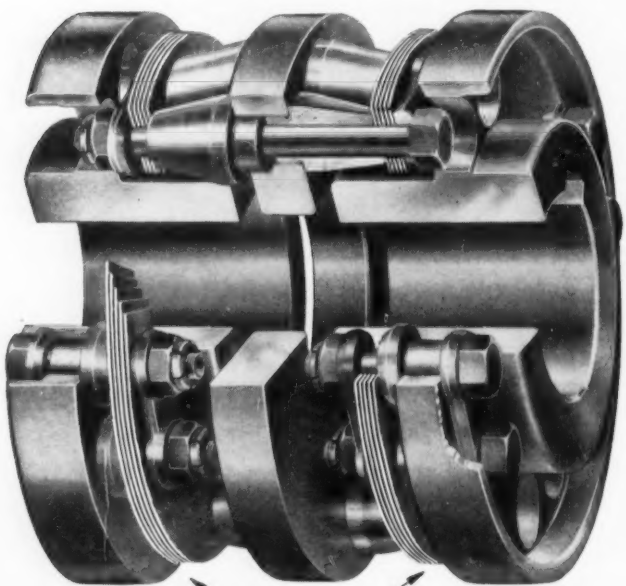
THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: ½ to 40,000 HP — 1 to 30,000 RPM.

Specialists on Couplings for more than 30 years



PATENTED FLEXIBLE DISC RINGS

BACKLASH FRICTION WEAR and CROSS-PULL are eliminated LUBRICATION IS NOT REQUIRED!

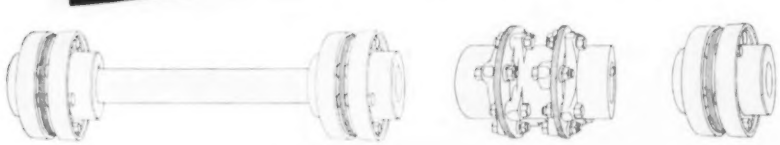
THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

• • •

NO MAINTENANCE PROBLEMS.

• • •

ALL PARTS ARE SOLIDLY BOLTED TOGETHER.



Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

Reduced Rate of Foreign Pig Tin Won't Mean Bigger Supply

Reduced prices in foreign pig tin do not necessarily mean an increased supply for the United States, NPA says. It forecasts the 1952 supplies at about 1951 levels.

In the meantime, the agency is preparing an amendment to M-25 which would restrict the use of can-making quality blackplate. The existing order restricts use of cans made of tin and terne plate and sets specifications for can production.

Fourth-quarter allocations for tinplate had not been decided over the weekend but NPA officials said the amount would be about the same as the 7715 tons of pig for the third quarter.

Switching to glass containers, due to cutbacks in tin cans, has brought an increased demand for tin closures. Third quarter 1950 closure consumption was about 91,000 against an estimated 102,000 tons of tinplate needed for third quarter 1951.

Talk With OPS on Price Order

Fabricators of structural shapes, plates, and bars are conferring with OPS over a proposed ceiling price regulation for their products.

Most of the industry representatives prefer a pricing formula to regulate operating margins on the basis of dollars per ton obtained in the fourth quarter 1950 on the contract most comparable to the one being priced.

The industry also is seeking approval of a higher costs clause.

Martin Orders from Others

The Glenn L. Martin Co. will place orders totaling $88,000,000 with other companies. Approximately $52,000,000 will go to subcontractors.

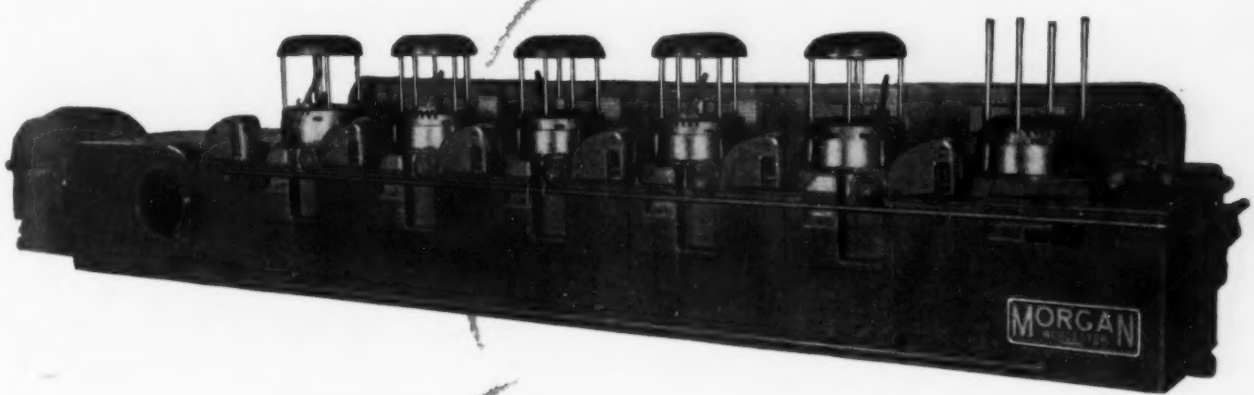
Much of the subcontracting program for aircraft components will not be delivered until 1952 with about two-thirds of the purchases being made from "small businesses."

HOW DOES YOUR WIRE MILL STAND ON Quality

Are high quality requirements keeping you out of "juicy" business?

Morgan-Connors are the answer to your problem.

Call in a Morgan engineer.



Replace with

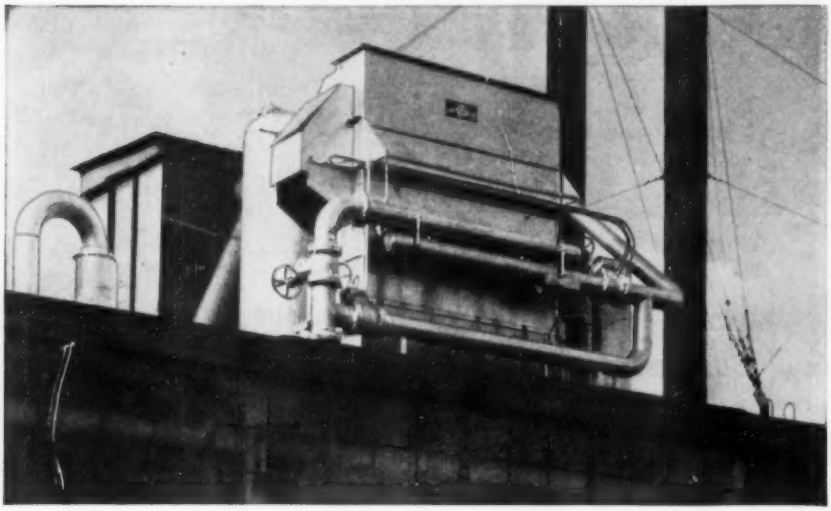
ROLLING MILLS
MORGOIL BEARINGS
REGENERATIVE FURNACE CONTROLS
AIR EJECTORS
PRODUCER GAS MACHINES

MORGAN-CONNOR
WIRE MACHINES

WM53

MORGAN CONSTRUCTION COMPANY • WORCESTER, MASSACHUSETTS

Direct saving of cooling water expense returns to you the cost of a Niagara Aero After Cooler in less than two years.



How to Get Drier Compressed Air:

It prevents many troubles and saves much expense

● NIAGARA AERO AFTER COOLER cools compressed air or gas below the temperature of the surrounding atmosphere. Therefore you get no further condensation in your lines. You save much in repairs to pneumatic tools and equipment; you save much interruption to production; you save water damage in paint spraying, in air cleaning, in any process where compressed air comes in contact with your materials or parts in manufacturing (sand blasting, for example).

Niagara Aero After Cooler uses evaporative cooling, saving 95% of your cooling water consumption. This saving quickly returns the cost of the equipment to the owner or makes extra cooling water available for other processes.

The Niagara Aero After Cooler produces compressed air with 30% to 50% less moisture than by ordinary cooling methods. Other Niagara equipment provides bone-dry air for processes requiring it.

If you have an air problem or a cooling problem, a Niagara engineer probably has an answer that will improve your process or save you operating or maintenance expense.

Write for Bulletin 98

NIAGARA BLOWER COMPANY

Over 35 Years Service in Industrial Air Engineering

Dept. IA, 405 Lexington Ave. **New York 17, N. Y.**

Experienced District Engineers in all Principal Cities

new equipment

Continued from Page 38

Chuck for angle drilling

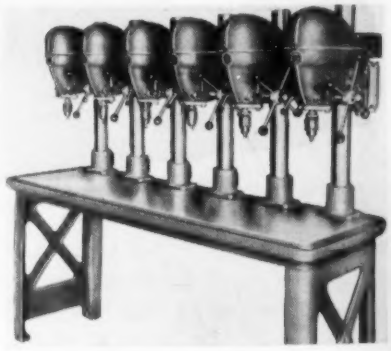
The new Ritmar chuck for angle and snake drilling consists of two pieces: the chuck, which is slotted to grip the drill, has two protrusions that prevent the drill from turning; the chuck lock adapter, with female threads at one end that fit the chuck to lock the drill in place, maintaining a firm grip. These chucks are manufactured for broken drills or regular drills with short shanks. *Ritmar Co.*

For more data insert No. 13 on postcard, p. 35.

Short interval timer

An electronic timer provides accurately controlled short interval timing for general purpose timing applications and for spot welding. It is applicable to manual, air or motor operated welding equipment requiring either beat or non-beat operation. The timing adjustment is calibrated for any interval from 3 to 120 cycles, and fulfills the specifications of NEMA class 1A non-synchronous timers. *Photoswitch Inc.*

For more data insert No. 14 on postcard, p. 35.



Drill presses

A new line of heavy duty, Darra-James 15-in. model, industrial multiple spindle drill presses are available with one to six heads mounted on large rugged table with cast iron legs. Features include self-aligning grease sealed ball bearings, double hinged guard, lifts from front to rear, free floating six spline spindle, and modern streamlined design. *Toolkraft Corp.*

For more data insert No. 15 on postcard, p. 35.

Turn to Page 134

BRIDGE MODERNIZATION AT CAIRO

SYMBOL OF ILLINOIS CENTRAL'S PROGRESSIVE SERVICE

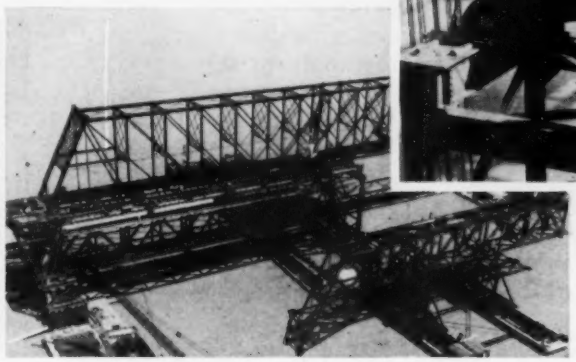
• This is the 100th anniversary of one of America's great railroads—the Illinois Central.

The year 1951 will also see the completion of a new steel superstructure for the Illinois Central's bridge over the Ohio River at Cairo, Illinois.

Twelve modern spans will replace a 61 year old, nine span structure, to accommodate today's heavier, faster traffic. American Bridge Company, because of its skill, know-how and wide experience, was the logical choice to perform the major construction feat of building the new superstructure on the original piers with a minimum interruption in traffic.

The first old span of the bridge was rolled off its piers onto temporary falsework and the new 518-foot, 1,700-ton span moved into position and opened to service after a traffic interruption of only 20 hours! Then the old span was launched like a ship into the river 100 feet below for easy removal.

While this is the first time this procedure has been used on a job of such magnitude, it is a typical example of the part American Bridge Company is playing to help our vital railroad systems meet the needs of growing America.



INTERESTING FACTS

- 6 spans, 197′ 7″
- 4 spans, 400′ 11½″
- 2 spans, 518′ 11″
- Bridge was single track, through truss. Steel used, 10,000 tons.
- Erecting procedure: Illinois Central R. R. and American Bridge Company.
- Consulting Engineers: Modjeski and Masters.

FOOT BY FOOT the old span, 60-ft. high and weighing 1,100 tons, is rolled over to rest on launching sleds atop temporary falsework. From this position it was launched into the Ohio 100 ft. below. **LEFT:** Falsework span No. 2 erected complete and jacked to elevation prior to floating. FAR LEFT: New span rolls into position four hours after movement started.

AVAILABLE NOW! *For showing in churches, schools, clubs and industries, the new sound and color motion picture—BUILDING FOR THE NATIONS—a candid, factual photographic record in full color of the highlights of the fabrication and erection of the United Nations' Secretariat Building in New York City.*

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

Contracting Offices in: AMBRIDGE · BALTIMORE · BOSTON · CHICAGO · CINCINNATI · CLEVELAND · DENVER · DETROIT · DULUTH · ELMIRA · GARY · MINNEAPOLIS NEW YORK · PHILADELPHIA · PITTSBURGH · PORTLAND, ORE. · ST. LOUIS · SAN FRANCISCO · TRENTON

UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS TRADE MARK

AMERICAN BRIDGE

UNITED STATES STEEL

MALLEABLE IRON GRINDING

Electro High Speed Grinding Wheels Save Dollars in Grinding Malleable Iron

Here are the Results in pounds of METAL REMOVED

Electro SINCE 1919

HIGH SPEED WHEELS FOR SNAGGING CUTTING-OFF TOOL ROOM AND CYLINDRICAL GRINDING for Swing Frame, Floor Stand, Bench Stand and Portable Grinding Machines

•

GRINDING WHEEL MANUAL 645 and Speed Calculator FREE ON REQUEST

The improved grain-holding resin bond in Electro High Speed Grinding Wheels, engineered to the job in hand, are two reasons for efficiencies 45% above competitive wheels. • Operating results show: 153 lbs. of metal removed while competitive wheels averaged only 105 lbs. under identical conditions. In grinding from 24" to 20" diameter Electro removed 6.8 lbs. of metal per cubic inch of wheel and 10.4 lbs. per hour. • Here's a 45% saving which holds regardless of size of annealed malleable castings. Comparable records apply to this and all other Electro wheels. • All we ask is opportunity to prove Electro's higher efficiencies in your plant on your work. No obligation. Write, phone or wire.

Electro Refractories & Abrasives Corporation

344 Delaware Ave. • Buffalo 2, N. Y.

HIGH SPEED *Electro* RESIN BONDED GRINDING WHEELS

WEST COAST WAREHOUSE, LOS ANGELES 58, CAL. • ELECTRIC FURNACE PLANT for SILICON CARBIDE MANUFACTURE, CAP-DE-LA-MADELEINE, P. Q., CANADA

new equipment

Continued

Phosphatizing compound

Ion-Kote, a new cleaning and phosphatizing compound, prepares steel and other metals for painting. It is a white, granular, easy to handle, dustless powder used in spray washers prior to painting and deposits a hard, dust-free, phosphate coating on metal that prevents rusting and increases paint adherence. *DuBois Co.*

For more data insert No. 16 on postcard, p. 33.

Four-pole relay

A new four-pole relay is particularly well suited for control assemblers, having all terminals exposed, being easily accessible, and occupying only a small space on the panel. Each of the four snap-action contact mechanisms is self-contained, and may be removed for inspection or replacement. The relay is rated 10 amp non-inductive, with inductive ratings of 5 amp at 600 v, 15 amp at 110 v. *Square D Co.*

For more data insert No. 17 on postcard, p. 33.

Combination hacksaw-drill

The Trade Master unit is a hand operated, electrically driven, combination hacksaw and drill. Just a flip of a button converts it from a drill to a saw. Regular hacksaw blades are used or blades prepared for special material or work. When operated as a drill, the saw guide is turned down. The unit takes up to ¼-in. drill. A flex sander, file and a hedge trimmer can be used also. *P. & L. Products Co.*

For more data insert No. 18 on postcard, p. 33.

Miniature control units

Lower operating expense and reduced space requirements for control panels in power and industrial process plants can be had with new miniature indicators and control units. These instruments, trade-named Mini-line, make it practical to concentrate into a small space before a single operator all information and controls for operating one or more boilers, turbines or process units such as foundries

Turn to Page 136

Van Huffel
cold-formed metal tubing and shapes
are profitably employed
in hundreds
of

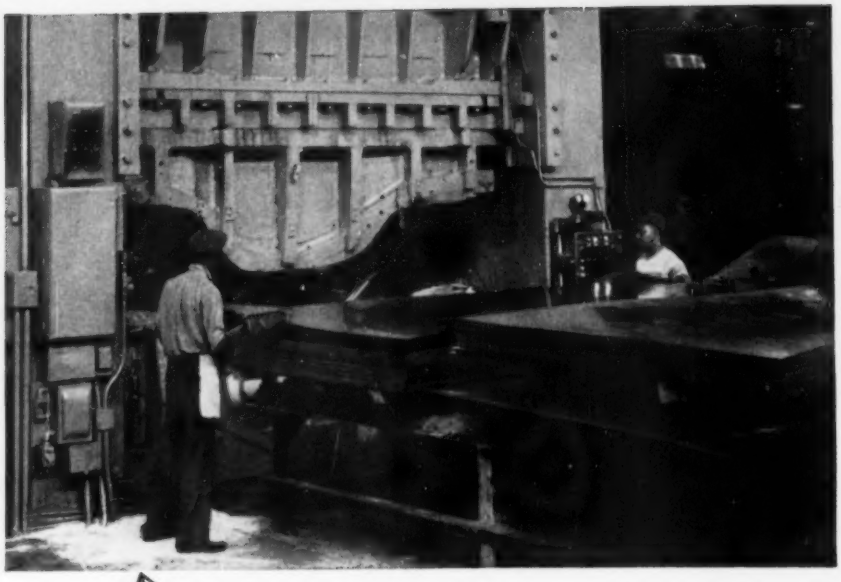
appliances

In the never-ending struggle to free
the modern home-maker from drudgery, Van Huffel
metal shapes and tubing have made
a distinctive contribution. For nearly 50 years,
designers of household appliances have
been specifying Van Huffel for items that
demand strength and style plus fabrication
simplicity and economy. Because of
Van Huffel's experience and versatility,
today's woman can look forward
to an even brighter future.

VAN HUFFEL

TUBE CORPORATION • WARREN, OHIO

WELDED, LOCK SEAM, OPEN SEAM, BUTTED TUBING, SHAPES AND MOULDINGS



THIS SPOT
ABSORBS DANGER!

That small spot is important to you. It's your protection against two of the most common industrial dangers—falls and fires resulting from waste oils, paints and other liquids.

The light spot is Wyandotte Zorball—the all-purpose floor absorbent that quickly removes these hazards. Just spread Zorball on the floor and immediately you have a safe, non-skid surface. Just sweep up the oil-soaked Zorball and immediately you have removed the danger of having these hazardous wastes cause fire.

Unlike any competitive floor absorbents, Zorball always maintains its original form! Even when saturated! Zorball never cakes, packs or forms "mud." Ask your Wyandotte Representative to demonstrate Zorball, the safest floor absorbent.

P.S.—If you're having any type of cleaning problem, consult Wyandotte for free technical information and service.

"Cleaning the World"

WYANDOTTE
ZORBALL

- *removes oils immediately*
- *gives lasting protection against fires*
- *is safe and economical*
- *harmless to wood, skin, metal, rubber*
- *will not break down and form "mud"*
- *does not cling to shoes*

THE WYANDOTTE LINE— products for burnishing and burring, vat, electro, steam gun, washing machine and emulsion cleaning, paint stripping, acid pickling, related surface treatments and spray-booth compounds. An all-purpose floor absorbent: Zorball. In fact, specialized products for every cleaning need.

WYANDOTTE CHEMICALS CORPORATION
WYANDOTTE, MICHIGAN
Service Representatives in 88 Cities

Wyandotte
REG. U. S. PAT. OFF.

new equipment

Continued

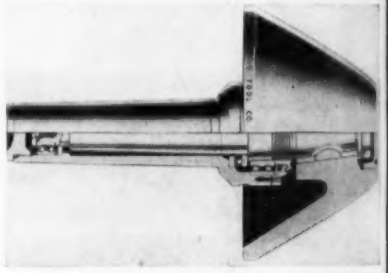
fuming plants, chemical plants and refineries. Space savings are considerable. Mini-line instruments are mounted on console type centralized control panels whenever possible, with control entirely automatic, or individual units or the entire system may be controlled manually from relays at the operator's finger tips. *Bailey Meter Co.*

For more data insert No. 19 on postcard, p. 31.

Electric counter

Capable of counting in excess of 10,000 units per sec, the operation of a new counter may be accumulative or pre-determined. The high-speed count is obtained through photo-cell and electronic circuits. Miniature parts, as well as large bulky units, may be easily and accurately counted. A visual six-digit totalizer indicates the exact count, while a rate meter shows the rate of count per hour. The counter may be located as far as 75 ft away from the photo-cell head. *Product Acceptance Co.*

For more data insert No. 20 on postcard, p. 31.



Multi-use center

The new tool is a bull nose, replaceable point center, with bull point that can be removed quickly and another point inserted without having to remove the center from the machine. It is suited for heavier type work on tubing or pieces with large center holes and is said to perform at top efficiency on engine lathes, turret lathes, or grinding machines. Roller bearing design assures accuracy providing maximum radial and thrust load capacities. Any shank, taper or head size is available. *Ready Tool Co.*

For more data insert No. 21 on postcard, p. 31.

Turn to Page 138

How Stewart Die Casting Gets More Work from a Standard Drill Press
TRIPLES DRILLING PRODUCTION
TURNS OUT 215 MORE PARTS PER HOUR
ANSCO DRILLS POLYSTYRENE 7 TIMES AS FAST...

Bellows "Controlled-Air-Power" Relieves the Shortage of Skilled Machine Operators

Take a look around your plant. Wherever you see an operator hand feeding a part to a tool or a tool to a part, there's an operation you can perform faster, safer and better with Bellows "Controlled-Air-Power" Devices.

These unique "packaged" air-powered units double, triple and even quadruple the output of standard machine tools; add immeasurably to the productive capacity of your highly essential skilled labor supply.

Call a Bellows Field Engineer. He's listed in the phone book in over a hundred cities under "The Bellows Co." Ask him to look over some of those manually handled operations. Let him show you case history after case history of just what Bellows "Controlled-Air-Power" is doing. It won't cost you a cent to look. It may help you solve more than one serious problem.

If there is not a Bellows Field Engineer near you, write us and we'll be glad to send you our latest Foto Facts File . . . complete case histories showing what Bellows equipment is accomplishing in plants large and small in all industries.

Address: Dept. I.A. 751

The Bellows Co.
AKRON 9, OHIO

1255

Cut blast cleaning costs with
EXTRA TOUGH
"Certified" Abrasives
Switch to Certified Abrasives and keep cleaning costs down! Certified's Samson Shot and Angular Grit are made extra tough by a special automatically controlled hardening process. They wear longer, can be used over and over again . . . and assure fast, efficient, high-quality blast cleaning. Try Certified in your cleaning room and you'll see why it's first choice in hundreds of foundries!
All sizes graded to S. A. E. specifications
Experienced foundrymen say:
Always specify "Certified"
Accepted and used for over 55 years
PITTSBURGH CRUSHED STEEL CO.
Pittsburgh, Pa.
STEEL SHOT AND GRIT CO.
Boston, Mass.
MEMBER FEMA

new equipment

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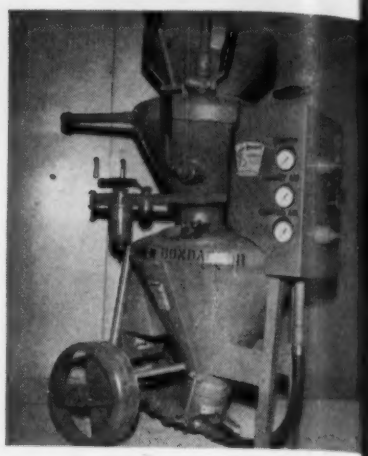


Refractory patches

A redesigned Bondact machine f air placement of refractory patc ing materials, rams them into pos tion by air pressure. The air plac ment of patching materials is sa to have proved effective for cupola and for open and mixing ladles. larger hopper provides greater c pacity for the refractory being a plied. Improved pressure contr makes possible a more exacting co trol over the moisture content the patch, resulting in a more un form and durable lining. Construc tion has been made heavier, and new control panel groups the gag to make operation as simple as po sible. *Eastern Clay Products, In*

For more data insert No. 22 on postcard, p.

Receiver recorder

A synchronized side-by-side reco of a number of measured variabl in a plant at a point remote fro the place of measurement is pr vided by a new multi-point a operated receiver recorder. The i strument can be used in conjun tion with a transmitter. The r ceiver records on a chart divide into three distinct zones and ope ates on 3, 4, 5, or 6 points. T system air pressure range is 3 15 psi and the maximum workin distance from the transmitters 1000 ft. Mechanism is mounted a cast aluminum case for wall flush panel mounting. *George Ke Ltd.*

For more data insert No. 23 on postcard, p.

Turn to Page 142

STEEL

THE VEHICLE OF DEFENSE

Without steel there would be little or no movement of men and material . . . there would be little or no defense.

For steel is the stuff of which tanks are made . . . in the hands of trained and spirited men, steel becomes a powerful engine of destruction to the enemies of free America.

Thousands upon thousands of tanks and a proportionate number of tank retrievers are now needed and are on order. The country's rolling mills and forges have the go-ahead to produce the many special steels required for these specialized vehicles.

Weirton Steel Company, pledged to participate in defense measures in any way and to any required degree, is supplying steel on approved allocation to hasten the completion of America's mechanized defense program.

WEIRTON STEEL COMPANY

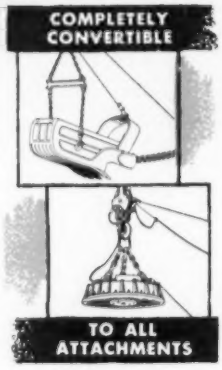
WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

NATIONAL STEEL

Built by modern precision methods, the UNIT 1520 leads the field in quality, and dependable performance. Designed for both "on and off" highway operation. So compact, it works efficiently even in small, cramped quarters, "in or out" of the yard.

- Rugged Construction
- Perfectly Balanced
- Hook Roller Construction
- Operated by ONE Man
- Powered by ONE Engine
- Hydraulic Steering
- Air Brakes and 4 Speed Air-Actuated Transmission
- Heavy Duty, yet operated with remarkable SPEED . . . SAFETY . . . ECONOMY!



UNIT 1520 can be equipped with retractable high A-Frame to permit capacity loads on extended boom at long radius.

UNIT CRANE & SHOVEL CORPORATION

6517 W. BURNHAM STREET • MILWAUKEE 14, WISCONSIN, U. S. A.

SHOVELS • DRAGLINES • CLAMSHELLS
CRANES • TRENCHOES • MAGNETS

new equipment

Continued

Thread-lock spindle nose

In a new thread-lock spindle nose the chuck is located and locked with one simple half turn of a locking ring, securing the chuck to the spindle with absolute accuracy. For precision location, the American Standard taper Dl-3 is employed in conjunction with the thread-lock principle. *Wade Tool Co.*

For more data insert No. 24 on postcard, p. 35.

Tandem paint heater

A production lacquer heating unit is a low cost, tandem type paint heater designed for hot spray finishing. Single or tandem installations can be mounted on the wall or equipped with casters for moving from place to place. Tandem installations may be ganged together in one jacket so that several colors are available at proper temperature at all times. Five inches square x 19 in. long, each unit weighs 28 lb without material circulating system. Units are cast aluminum throughout, with temperature and pressure gages included. *Dualheet, Inc.*

For more data insert No. 25 on postcard, p. 35.

Low-pressure cylinder

Features of the Hanna Model 4-M cylinder include a cork floater ring that facilitates cushion alignment with the head and insures a seal during cushioning; spring-backed chevron rod packings that are self-adjusting for consistently correct compression; and the flange design that permits removal of the front head without disturbing the mounting. LP cylinders are designed for operation up to 110 psi and, with minor modifications, for higher pressures depending on cylinder diameter and operating medium (air, oil or water.) *Hanna Engineering Works.*

For more data insert No. 26 on postcard, p. 35.

Resume Your Reading on Page 39

the SKILL *the* FACILITIES

. . . *to deliver* TRUE PRECISION *in Parts Such As These*

When many of the country's largest and most prominent manufacturers require hardened and precision ground parts that must adhere rigidly to quality specifications and meet every precision requirement, they rely on Allied to produce them. They *know* that, no matter how difficult or in how high a volume the parts may be . . . regardless of the number of operations involved . . . Allied has the personnel and equipment to do the job right, economically and on time.

Other
ALLIED PRODUCTS

SPECIAL COLD FORGED PARTS
STANDARD CAP SCREWS • SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • ALLITE ZINC ALLOY DIES • JIGS • FIXTURES
R-B INTERCHANGEABLE PUNCHES AND DIES

PRECISION • EXPERIENCE • DEPENDABILITY
ALLIED PRODUCTS CORPORATION

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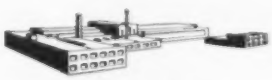
DEPT. D-1 • 12617 BURT ROAD • DETROIT 23, MICH.

PLANT 1
Detroit, Mich.

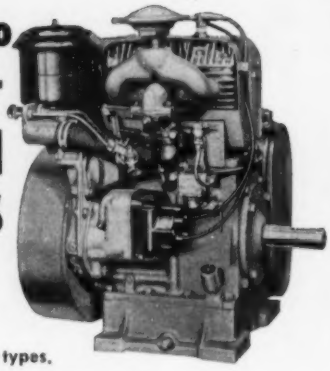

PLANT 2
Detroit, Mich.

PLANT 3
Hillsdale, Mich.

PLANT 4
Hillsdale, Mich.

POWER ADVANTAGE in the 7 to 13 hp. Range...The 2-Cylinder

WISCONSIN *Air-Cooled* ENGINES



Here is the POWER ADVANTAGE story of the 2-cylinder Wisconsin Heavy-Duty Air-Cooled Engines, the development of which fills the need for a power linkage between the single-cylinder and four-cylinder types.

1. Dependable air-cooling under all climatic and weather conditions.
2. Self-cleaning tapered roller bearings at both ends of the crankshaft to withstand either side-pull or end-thrust without danger to bearings.
3. Rotary type high tension OUTSIDE Magneto with Impulse Coupling operates as an entirely independent unit that can be serviced or replaced in a few minutes.
4. Maximum torque at usable speeds for equipment that really has to go to work.

CONDENSED SPECIFICATIONS

MODELS		TE	TF
Bore	inches	3	3¼
Stroke	inches	3¼	3¼
Piston Disp. cubic inches		45.9	53.9
Horsepower			
1400 rpm		7.2	8.6
2000 rpm		10	12
2600 rpm		11.2	13.3
Net weight in lbs., Standard engine, side-mount tank		220	220

Our engineering department will gladly cooperate with you in adapting Wisconsin Engines to your requirements. Write for detailed data and name of the nearest Wisconsin distributor.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

CLARK
QUALITY INDUSTRIAL FASTENERS SINCE 1854
CLARK BROS
FOR
GREATER SECURITY
FASTEN FAST WITH
CLARK FASTENERS
They work easy . . . hold fast and firm with a dependability that has been characteristic of CLARK FASTENERS for almost a Century.
6-L-3c
CLARK BROS BOLT CO
MILLDALE, CONN.
BOLTS • NUTS • RIVETS • SCREWS

publications

Continued from Page 35

Electric counters

Productimeter electric counters take the guesswork out of high-speed counting operations. A new 4-p. leaflet describes the latest models of these electronic control units. Some of the articles which have been successfully handled include paper cups, bottle caps, wood heels. *Durant Mfg. Co.*

For free copy insert No. 32 on postcard, p. 35.

Bar machines

A new 16-p. booklet describes the six-spindle Conomatic bar machines. Many cutaway illustrations show the working mechanisms of these machines. Typical commonly used tools and work holders and examples of parts produced are described. Machine capacities, work spindle speeds and other information is included. *Cone Automatic Machine Co., Inc.*

For free copy insert No. 33 on postcard, p. 35.

Packaging

Safe Journey is the title of a 56-p. booklet describing modern cost-cutting packaging methods. Cartons, warehousing, better utilization of car and truck space are a few of the subjects considered. The booklet also contains valuable information on moisture protection, government specifications and packaging of combustibles. *American Partition Corp.*

For free copy insert No. 34 on postcard, p. 35.

Safety saves!

That sound caution and strict observance of sensible safety rules pay off for the fork-truck driver as well as for his employer, is the pleasant theme of a new 24-p. booklet. The book sets forth the "Do's" and "Don'ts" which experience has established as a simple, practical code of operation. The various admonitions, presented in good-humored fashion and pointed up by cartoons, are offered as a refresher course for experienced operators, and as a helpful guide to those new at the job. *Industrial Truck Div., Clark Equipment Co.*

For free copy insert No. 35 on postcard, p. 35.

Turn to Page 148

PROPERTY PROTECTION

An Emergency Measure Anytime

MADE OF *KONIK STEEL

ONLY *CONTINENTAL FENCE IS MADE OF *KONIK STEEL

The copper, nickel and chromium in KONIK steel give this fence fabric strength and long life. Galvanizing the KONIK fabric *after weaving* gives it even greater protection against rust and corrosion. Only Continental fence is made of KONIK steel.

● The need for controlling entrance and exit to and from industrial and institutional property is a protection emergency any time. One unnecessary loss or accident may cost much more than a complete fence installation. Today, added fire and theft protection is more urgent than ever. These and other fencing advantages can pay off in lower insurance rates . . . through reduced guard costs. And, long-lasting Continental KONIK fence pays off too in lower cost per year of fence life. Make sure your emergency protection is adequate and reasonably permanent . . . make sure it's Continental KONIK.

Every Continental fence installation is planned by our fence engineers —tailored to fit and harmonize with the property it protects.

Experienced engineers plan and help erect Continental fence. They work with you, laying out the most effective protection installation.

WE'LL SEND YOU THIS FREE FENCE MANUAL

A card will bring your copy of "Planned Protection"—a modern manual on protection and control of property. Write Continental at Kokomo or contact our nearest sales office.

*Due to present National Defense requirements for nickel and chromium, two critical war materials, Continental Fence will not be available in "Konik" steel for the duration of this emergency.

*Trade Marks Reg. U. S. Pat. Off.

CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF *Manufacturer's Wire* in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

To the Owners of Small or Medium-Sized Businesses

Who seek an ESCAPE from the TRAP of Today's Taxes

The sale of corporate ownership to a friendly party may have distinct advantages for you at the present time:

1. The profit realized as a result of such a sale is taxable on a capital gain basis and not as ordinary income.
2. The current depressed condition of the securities market offers opportunities for diversification of risk plus greater yields after taxes than may reasonably be expected from most individually or family-owned businesses.
3. Sale now will eliminate any possibility of a forced sale later at a sacrifice to provide funds for the payment of estate or inheritance taxes.

The continued employment of the seller or of deserving employees need not be disturbed. Our management compensation incentive plan will retain for you most of the prerogatives of ownership, should you wish to continue in management.

If you, like many others, are wondering how to extricate yourself from the trap of today's taxes, please write us for an appointment to talk it over. All inquiries will be held in strictest confidence.

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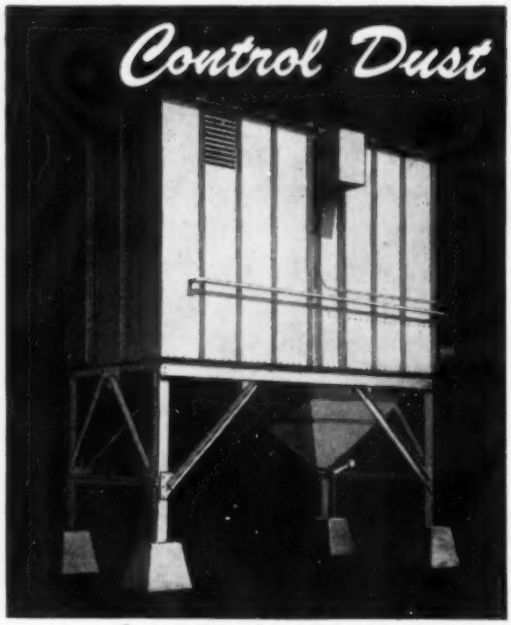

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RUEMELIN TUBULAR TYPE FILTER

A Ruemelin Tubular Type Cloth Filter is the modern way to handle industrial dusts created in foundry cleaning rooms, metal working plants, cement mills and many other applications. The simplicity of Ruemelin Dust Filter design means low operating and maintenance costs. Definite power savings are assured by lower resistance to air flow.

NEW DUST FILTER BULLETIN AVAILABLE

Write for our new Bulletin No. 24-D just released. Learn for yourself the advantages you secure with a Ruemelin Bag Filter and at no extra cost.

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MANUFACTURERS AND ENGINEERS
SAND BLAST AND DUST COLLECTING EQUIPMENT
3870 NORTH PALMER STREET • MILWAUKEE 12, WISCONSIN, U. S. A.

A 5881-½R

publications

Continued

Solder

Nature, properties, and uses of solder are described in a new 36-p. profusely illustrated brochure. Sections are devoted to thermal effects, mechanical properties, principles of soldering, and fluxes. Selection of the proper solder for a job is explained; fusible alloys, a group of alloys with low melting points, are described. A resume of solder specifications and technical data is included. *Federated Metals Div., American Smelting & Refining Co.*

For free copy insert No. 36 on postcard, p. 35.

Duplex recorder

Comparison measurement of two independent variables is possible with the new ElectroniK recorder. This instrument, which embodies two complete measuring systems and recorders, is described in a new data sheet. Operation and construction of the instrument, which can be actuated from any dc source, is explained. *Minneapolis-Honeywell Regulator Co.*

For free copy insert No. 37 on postcard, p. 35.

Speed reducers

Single and double reduction Torque-Arm speed reducers are described in two vividly illustrated booklets. One illustrates the new Torque-Arm speed reducer in cut apart photos. The 16-p. booklet contains much useful data on power transmission. The second, a 12-p. brochure, describes the single-reduction series and shows application of the products to various industrial uses. *Dodge Mfg. Corp.*

For free copy insert No. 38 on postcard, p. 35.

Voltage regulators

Automatic voltage regulators are described in a new 12-p. bulletin featuring the complete line of standard Stabiline products. All standard models of both Instantaneous Electronic and Electro Mechanical are discussed. Applications of the stabilizers to typical electronic circuits are described. *The Superior Electric Co.*

For free copy insert No. 39 on postcard, p. 35.

Resume Your Reading on Page 36

IRON AGE *markets and prices*

market briefs and bulletins

price advances—As expected, producers of steels containing more than 5 pct nickel are increasing their prices. Allegheny Ludlum Steel Corp. and Crucible Steel Co. were the first to announce increases effective June 26 and 27 respectively. The increases cover the rise of 6¢ per lb in cost of nickel in stainless steels, including seamless tubes and castings. The increases range from ⅛¢ to 1.7¢ per lb; on high temperature alloys from ¼¢ to 1.25¢ per lb and on electrical alloys from 2.25¢ to 4.25¢ per lb.

coke facilities sold—Niagara Mohawk Power Corp. has sold the coke-producing facilities at its Troy, N. Y., coke and gas plant, to Republic Steel Corp. Niagara is introducing natural gas to replace the manufactured gas in the area served by the Troy plant. The transfer of the property will become effective when the natural gas becomes available. The coke facilities of the Troy plant adjoin the Republic Steel blast furnace there.

CMP allotments—Companies in some areas have received their initial allotments of aluminum, copper and steel under CMP. Although all companies have not received some materials there are those who have received 100 pct of their orders. However, firms which had ordered in excess of their allotments for the third quarter will have to accept reductions.

RFC loans—All RFC loans will be reviewed by the Washington office for final approval. Until last week, each of the 32 regional RFC offices could grant loans up to $100,000 without approval from Washington. The regional offices will continue to receive applications and make recommendations.

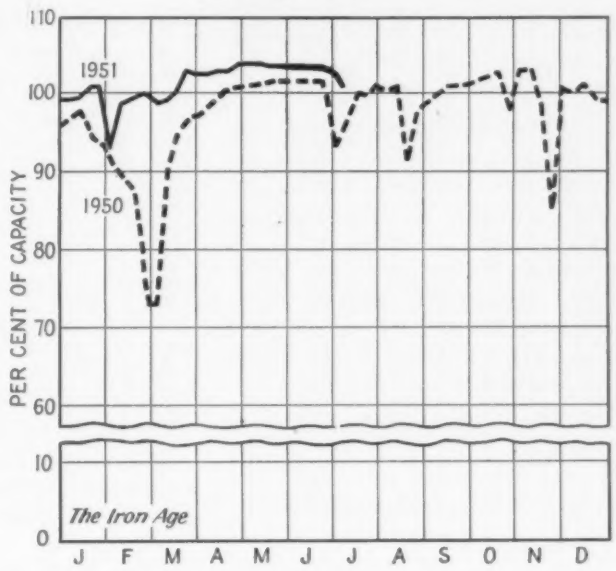
new blast furnace—Progress on the No. 4 blast furnace of Woodward Iron Co. is progressing, according to company officials, and is expected to be in operation by early 1952. The new furnace will have a daily rated capacity of 650 gross tons of pig iron. Alabama By-Products Co. expects to have its new battery of 30 coke ovens completed by October.

cut scrap lead price—Top grade secondary lead was rolled back in price from 21¢ to 17¢ per lb last Friday. The order is effective immediately. The reason given for the price cut was that secondary lead prices had climbed out of proportion to new metal. Reason for the haste was that the office of price stabilization was afraid of losing its power to roll prices back.

contracts awarded—A $22 million order has been awarded to the Caterpillar Tractor Co. by the U. S. Army, Corps of Engineers, for three of its larger models of track type tractors. Options for additional machines and parts included in the order could bring the total contract to around $32 million.

Canadian application—Canadian Steel importers who require steel from the U. S. for use in the period Sept. 1 to Dec. 31 this year must now make special application to the steel division of the department of defense production, according to the Canadian Government.

Steel Operations †



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
June 24	103.0	106.0	96.0	100.5	106.0	104.0	98.0	106.0	101.0	99.0	87.0	99.0	96.5	103.0
July 1	101.0	106.0	95.0	99.5	103.0	104.0	96.0	85.0	97.0	99.0	87.0	95.0	84.0	101.0

* Revised.
† Beginning Jan. 1, 1951, operations are based on annual capacity of 104,229,650 net tons

nonferrous metals

outlook and market activities

by R.Hatschek

NONFERROUS METAL PRICES

	June 27	June 28	June 29	June 30	July 2	July 3
Copper, electro, Conn....	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered..	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York....	$1.06	$1.06	$1.06	....	$1.06	$1.06*
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	16.80	16.80	16.80	16.80	16.80	16.80

*Tentative.

Note: Quotations are going prices.

Silver Price Bounces — Last Thursday the Handy & Harman quotation for silver jumped from 87.75¢ per lb up to 90.16¢. The lower figure had held from June 7 when the price dipped from 90.16¢. Cause of the latest change is that Mexico, our largest foreign silver source, will not export any more of the metal this year because of other commitments. The new price is again equivalent to the Treasury's price for newly mined domestic silver.

Set Export Quotas—Some 1800 net tons of lead will be permitted for export purposes during the third quarter under quotas announced by the Office of International Trade in Washington. This figure includes pigs and bars, concentrates and scrap, and lead manufactures under Schedule B, Nos. 650406 to 651598.

Quota for tungsten export licensing was set at 6000 lb, which includes metal, stellite, wire shapes, alloys, and so forth.

To Escape Tin Contract—General Services Administration is planning on using the escape clause in the tin purchase contract with Indonesia and the Belgian Congo. An insignificant purchase of 100 tons of metal at $1.03 will be made under the terms of the contract and if the tin suppliers refuse it would mean the cancellation of the contract.

For this to be possible, the average tin price must remain in excess of $1.03 for the first 7 days of July. The average is taken as the mean between the New York equivalent of the Singapore price and the grade A, prompt delivery price at New York, less 2¢. As this is being written, the Singapore price is several cents above RFC's $1.06 price. The price in the Far East may be expected to come down a bit but it seems to be a safe bet that RFC will maintain the current quotation at least until next week.

Ore Contract Not Hit—Because it falls under a separate contract, the tin concentrates imported from those sources for smelting at the government's Texas City plant will continue to come in. Meanwhile, negotiations for Bolivian tin ore continues with no details available to the public.

MONTHLY AVERAGE PRICES

The average prices of the major nonferrous metals in June based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	24.50
Lake copper, delivered	24.625
Straits tin, New York	$1.1805
Zinc, East St. Louis	17.50
Zinc, New York	18.25
Lead, St. Louis	16.80
Lead, New York	17.00

Stockpile Needs Cut—The Munitions Board has "greatly reduced" stockpile requirements of tin, according to W. Stuart Symington, Reconstruction Finance Corp. administrator. This is yet another step by the government in forcing tin prices down by reducing world demand.

Copper Prices—Dealers' buying prices on scrap copper and brass are running from 1½¢ below the ceiling up to the actual ceiling. They can afford to pay ceiling prices in some cases because of the premiums allowed to dealers.

The confusion caused by the 27.5¢ Chilean copper price continues. As yet the government has made no rulings on what a smelter who pays on the higher basis and yet must sell on the 24.5¢ basis is to do. One brass mill executive told THE IRON AGE that his company "loses less when producing with high-cost materal than when not producing at all."

Beat the Deadline—Price Administrator Mike DiSalle was a busy man as the rollback ban neared last Saturday. He put his signature on a secondary lead rollback order (see p. 149) and then signed another on secondary and scrap aluminum prices. The lawmakers' actions in banning rollbacks at least did hasten a few of the more vital orders.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Steel: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63-S-T-5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.142; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.024 in. x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb.; 0.024 in. x 28 in. 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in. 63¢; 3/16 in. 65¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lbs.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ⅜ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base Up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb, ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ⅞, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	40.18	....	39.78
Copper, h-r	....	36.03	....
Copper, drawn	....	37.28	....
Low brass	38.47	38.16	....
Yellow brass	37.28	36.97	....
Red brass	38.86	38.55	....
Naval brass	42.27	36.33	37.59
Leaded brass	....	....	35.86
Com'l bronze	40.18	39.87	....
Mang. bronze	45.77	39.80	41.36
Phos. bronze	59.42	59.67	....
Muntz metal	40.28	35.84	37.09
Ni silver, 10 pct	48.26	50.59	....
Arch. bronze	....	....	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	42.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.10 to $2.17
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$210-$213
Nickel electro, f.o.b. N.Y. warehouse	59.58
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	90.16
Tin, New York	$1.06
Titanium, sponge	$5.00
Zinc, East St Louis	17.50
Zinc, New York	18.25
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	47.50
No. 215	44.50
No. 245	37.00
Yellow ingot	
No. 405	25.50
Manganese bronze	
No. 421	32.75

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

OPS CEILING PRICE

Al, 92 pct min.; Zn, .30 pct max.; Se, .60 pct max.; Mg, 1.5 pct max.; Pb, .20 pct max.; Cn, .60 pct max. 12.5

Other grades correspondingly lower.

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.00
Grade 2—92-95%	17.75
Grade 3—90-92%	17.25
Grade 4—85-90%	16.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39½
Electrodeposited	33⅜
Rolled, oval, straight, delivered	38⅞
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow Brass	19¼	17⅞
Red brass	20¼	19⅝
Comm. bronze	20½	19¾
Mang. bronze	18¾	18
Brass rod ends	18⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	15.50

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	19.50
No. 1 comp. turnings	19.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	15.50
Aluminum	
Mixed old cast	9.75
Mixed turnings, dry	9.5
Pots and pans	9.25

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	17¾—19¼
No. 2 heavy copper and wire	16¼—17¾
Light copper	15 —16½
New type shell cuttings	15 —16½
Auto radiators (unsweated)	14 —15½
No. 1 composition	18 —19½
No. 1 composition turnings	17¾—19¼
Unlined red car boxes	17¾—19¼
Cocks and faucets	15¼—16¾
Mixed heavy yellow brass	12½—14
Old rolled brass	14 —15½
Brass pipe	15 —16½
New soft brass clippings	15 —16½
Brass rod ends	17⅜—18⅞
No. 1 brass rod turnings	17¾—19¼

Aluminum

Alum. pistons and struts	9.75
Aluminum crankcases	9.75
Old sheet and utensils	9.25
Borings and turnings	9.5
Misc. cast aluminum	9.75

Zinc

New zinc clippings	12¼—12½
Old zinc	9 — 9¼
Zinc routings	5¾— 6
Old die cast scrap	5¾— 6

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	14 —14½
Battery plates (dry)	9½—10

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	85 —90
No. 1 pewter	60 —65
No. 1 auto babbitt	50 —55
Mixed common babbitt	16 —17
Solder joints	21 —22
Siphon tops	55 —60
Small foundry type	18¾—19
Monotype	17½—18
Lino. and stereotype	17
Electrotype	15¾—16
Hand picked type shells	11½—11¾
Lino. and stereo. dross	9½—10
Electro. dross	7½— 8

SCRAP *iron and steel*

markets
prices
trends

Autowreckers to wage campaign to get out graveyard scrap quickly . . . Discuss S. Korean war scrap sale.

NPA's industrial scrap campaign was given impetus this week when the National Auto Wreckers Assn. said its members will organize a program to clean up the nation's auto graveyards. Although NPA had no official figures it guessed that from 2.5 million to 3 million tons of scrap can be produced from this source over the next 12 months.

NPA also made official its revision of estimated scrap needs this year. Now it stands at 36 millions plus. (THE IRON AGE, June 28, 1951, pp. 91, 172).

Members of the NAWA are located in 102 cities. They have appointed 13 regional committee chairmen, using as regional areas the 13 Commerce Dept. regions. A coordinated campaign will be waged to impress wrecking companies with the necessity of removing saleable parts from junked cars as quickly as possible and getting the remainder into scrap channels. This was advocated in the News of Industry scrap story last week. Since some auto graveyards are glutted with junked cars, getting out the scrap will empty out their yards for new business.

NPA said scrap inventories had dropped 1 million tons during the first 4 months of 1951. This decline was almost halted by May but some mills have been bled almost dry on scrap and are being saved only by timely allocations. NPA also plans to hit the farm areas for heavy scrap. Farmers are now in their season and haven't too much time to go about pushing scrap out. But the NPA campaign will hit them hard at harvest time.

The scrap trade last week was talking over a report that South Korean war scrap would go to Japan. Some were bitter that the U. S. was deprived of this material when it was needed most. Others said that Japanese mills had received shipments of Pacific war scrap before and were working on the side of America anyway. Price of this Korean scrap to West Coast mills would have been very high, it is pointed out.

PITTSBURGH—Mills and dealers here are fighting a running battle on grading. One consumer complained that it is almost impossible to maintain even reasonable inspection standards. He charged that some dealers threatened to cut off shipments when he insists on downgrading after inspection. Some mills are in slightly better position inventorywise. Others feel lucky to balance receipts with consumption.

CHICAGO—Scrap inventory at the Gary Works of the U. S. Steel Co. remains at about 1 week. However, dealer allocations have been made for the mill, although none of the allocated tonnage has been delivered as yet. The situation at Gary is expected to improve within the next few weeks because of this. Foundry inventories seem healthier than those of the mills possibly because of a falling off of nondefense business. The start of plant vacations will cut down scrap coming from these sources for the next 2 months.

PHILADELPHIA—Allocations of dealer scrap have hit this district on a wholesale scale in the past couple of weeks. Practically all eastern Pennsylvania mills are getting their cut. One of the things that has hurt scrap generation is that many plants have cut back on their civilian goods output and have not yet begun to produce on government orders. This situation should improve somewhat later this year. Vacation shutdowns starting this week will also hurt scrap flow. No. 2 scrap does not seem to be holding back despite the fact that most members of the trade expect all openhearth grades to be lumped together soon. Cast is a bit tighter this week.

NEW YORK—Insistence of demand is pushing scrap men here to the limit. They are hearing some complaints from mills that scrap is also needed for inventory buildup to take care of winter operations. Brokers can't do too much about this. In the cast group, scrap men here can keep all plants going. The trade is awaiting some results from the conference Washington held last week on the subject of lumping together openhearth grades. They don't expect the price to slip much on this arrangement.

DETROIT—Recent production cutbacks by Chrysler and others is expected eventually to tighten an already difficult scrap situation. It is now evident that the usual scrap build-up during July and August will not be possible in the face of allocations. Some sources are convinced that only a sharp drop in the steel operations rate will prevent a very serious scrap crisis here later in the year.

CLEVELAND — Openhearth grades are very tight here and in the Valley. Cast grades have eased somewhat and some of the upgrading of the past month has been cleaned up. Blast furnace material was sloppy last month because mills were specifying production material. Some moved out of this district in June. The trade figures that openhearth grades will be combined. Inventories are not good and the outlook for winter makes a Korean truce attractive indeed to the mills.

BIRMINGHAM—Cast and foundry scrap continues to come into the district in fair amounts but hardly more than enough to take care of the most pressing needs of the area. Heavy melting steel and other grades used by the steel mills continue scarce.

CINCINNATI—Scrap is scarce and mills are low. Earmarking is at peak. Foundries are no longer desperate for tonnage, as most have been able to accumulate a little inventory and the cast situation is definitely improved. Trade sources hint that some small lots of tonnage are being held in anticipation of combined grades.

ST. LOUIS—Collection of scrap iron, in this predominantly agricultural region, is now in for its usual summer slump. Last week the movement to this district was slowed up principally because of heavy rains throughout the whole producing territory. As the weather improves, farmers will drop everything to work in the fields. Hot weather will slow up the processing of such scrap as reached this market. In the meantime, the steel mills have from 10 days to 2 weeks' supply in their piles. One railroad, the Missouri Kansas Texas came up with an offering of an undetermined tonnage.

BOSTON—The tone of the scrap market here in the New England area continues to show an ever increasing demand. Activity is still heavy in all grades of iron and steel scrap with little change over the past several weeks.

Official Army Photo, released by Dept. of Defense

It takes plenty of **SCRAP** *...to be ready for one!*

Tanks like this M-26 are the Army's dry-land dreadnaughts . . . built to give the ground forces fast-moving firepower . . . built, too, to protect the crews that man the guns. That means tons of armor plate per tank . . . tons of nickel-bearing steel, much of which must be made from scrap. Keeping this scrap moving to the mills is an industry-wide job . . . and our No. 1 specialty.

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Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS, effective Feb. 7, 1951. Shipping point and delivered prices calculated as shown below.)

Switching Charge (Dollars per gross ton) →		$0.99	.75	.53	.65	.75	.51	.75	.75	.51	.51	.75	.70	.78	.83	.65	1.34	.79	.50	.20	.51	.51	.20	.52	.47	.51	.51	.51	.95	.50	.78	.50	.43	.51	.33	.57	.68	.69	.82	.89	.89
Basing Points →		Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Steubenville	Warren	Weirton	Cleveland	Buffalo	Cincinnati	Chicago	Claymont	Coatesville	Conshohocken	Harrisburg	Phoenixville	Sparrows Pt.	Bethlehem	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minnequa	Houston	Los Angeles	Pittsburg, Cal.	Portland, Ore.	San Francisco	Seattle
GRADES	OPS No.																																								
No. 1 heavy melting	1	$44.00							$44.00					$43.00			$42.50							$42.00				$41.00	$41.15	$40.00	$39.50	$39.00		$38.00	$37.00	$35.00					
No. 2 heavy melting	2	42.00							42.00					41.00			40.50							40.00				39.00	39.15	38.00	37.50	37.00		36.00	35.00	33.00					
No. 1 busheling	3	44.00							44.00					43.00			42.50							42.00				41.00	41.15	40.00	39.50	39.00		38.00	37.00	35.00					
No. 1 bundles	4	44.00							44.00					43.00			42.50							42.00				41.00	41.15	40.00	39.50	39.00		38.00	37.00	35.00					
No. 2 bundles	5	41.00							41.00					40.00			39.50							39.00				38.00	38.15	37.00	36.50	36.00		35.00	34.00	32.00					
Machine shop turnings	6	34.00							34.00					33.00			32.50							32.00				31.00	31.15	30.00	29.50	29.00		28.00	27.00	25.00					
Mixed borings and turnings	7	38.00							38.00					37.00			36.50							36.00				35.00	35.15	34.00	33.50	33.00		32.00	31.00	29.00					
Shovelling turnings	8	38.00							38.00					37.00			36.50							36.00				35.00	35.15	34.00	33.50	33.00		32.00	31.00	29.00					
Cast iron borings	10	38.00							38.00					37.00			36.50							36.00				35.00	35.15	34.00	33.50	33.00		32.00	31.00	29.00					
No. 1 chemical borings	26	41.00							41.00					40.00			39.50							39.00				38.00	38.15	37.00	36.50	36.00		35.00	34.00	32.00					
Forge crops	11	51.50							51.50					50.50			50.00							49.50				48.50	48.65	47.50	47.00	46.50		45.50	44.50	42.50					
Bar crops and plate	12	49.00							49.00					48.00			47.50							47.00				46.00	46.15	45.00	44.50	44.00		43.00	42.00	40.00					
Punchings and plate	14	46.50							46.50					45.50			45.00							44.50				43.50	43.65	42.50	42.00	41.50		40.50	39.50	37.50					
Electric furnace bundles	15	46.00							46.00					45.00			44.50							44.00				43.00	43.15	42.00	41.50	41.00		40.00	39.00	37.00					
Cut struct., plate, 3 ft and less	16	47.00							47.00					46.00			45.50							45.00				44.00	44.15	43.00	42.50	42.00		41.00	40.00	38.00					
Cut struct., plate, 2 ft and less	17	49.00							49.00					48.00			47.50							47.00				46.00	46.15	45.00	44.50	44.00		43.00	42.00	40.00					
Cut struct., plate, 1 ft and less	18	50.00							50.00					49.00			48.50							48.00				47.00	47.15	46.00	45.50	45.00		44.00	43.00	41.00					
Foundry steel, 2 ft and less	20	46.00							46.00					45.00			44.50							44.00				43.00	43.15	42.00	41.50	41.00		40.00	39.00	37.00					
Foundry steel, 1 ft and less	21	48.00							48.00					47.00			46.50							46.00				45.00	45.15	44.00	43.50	43.00		42.00	41.00	39.00					
Heavy trimmings	24	43.00							43.00					42.00			41.50							41.00				40.00	40.15	39.00	38.50	38.00		37.00	36.00	34.00					
No. 1 RR heavy melting	RR 1	46.00							46.00					45.00			44.50							44.00				43.00	43.15	42.00	41.50	41.00		40.00	39.00	37.00					
Scrap rails, random lengths	RR 14	48.00							48.00					47.00			46.50							46.00				45.00	45.15	44.00	43.50	43.00		42.00	41.00	39.00					
Scrap rails, 3 ft and less	RR 16	51.00							51.00					50.00			49.50							49.00				48.00	48.15	47.00	46.50	46.00		45.00	44.00	42.00					
Scrap rails, 2 ft and less	RR 17	52.00							52.00					51.00			50.50							50.00				49.00	49.15	48.00	47.50	47.00		46.00	45.00	43.00					
Scrap rails, 18 in. and less	RR 18	54.00							54.00					53.00			52.50							52.00				51.00	51.15	50.00	49.50	49.00		48.00	47.00	45.00					
Rerolling rails	RR 15	53.00							53.00					52.00			51.50							51.00				50.00	50.15	49.00	48.50	48.00		47.00	46.00	44.00					
Uncut tires	RR 20	48.00							48.00					47.00			46.50							46.00				45.00	45.15	44.00	43.50	43.00		42.00	41.00	39.00					
Cut tires	RR 21	51.00							51.00					50.00			49.50							49.00				48.00	48.15	47.00	46.50	46.00		45.00	44.00	42.00					
Cut bolsters and side frames	RR 23	49.00							49.00					48.00			47.50							47.00				46.00	46.15	45.00	44.50	44.00		43.00	42.00	40.00					
RR specialties	RR 24, 28, 29	51.00							51.00					50.00			49.50							49.00				48.00	48.15	47.00	46.50	46.00		45.00	44.00	42.00					
Solid steel axles	RR 25	58.00							58.00					57.00			56.50							56.00				55.00	55.15	54.00	53.50	53.00		52.00	51.00	49.00					
No. 3 steel wheels	RR 27	51.00							51.00					50.00			49.50							49.00				48.00	48.15	47.00	46.50	46.00		45.00	44.00	42.00					

Cast Scrap

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y. cast	11	52.00

Ceiling price of clean cast iron foundry runouts or prepared cupola drops is 75 pct of corresponding grade.

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh; Bessemer, Homestead, Duquesne, Munhall. Cincinnati; Newport. St. Louis; Granite City, East St. Louis, Madison, and Federal, Ill. San Francisco; South San Francisco, Niles, Oakland. Claymont; Chester. Chicago; Gary.

SHIPPING POINT PRICES (Except RR scrap)—For shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is $1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, $1.50, and New England ports, $1.75. Maximum shipping point price on No. 1 heavy melting steel in New York City is $36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Ceiling need not fall below $32 per gross ton for No. 1 heavy melting steel, with set differentials for other grades. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap) — Ceiling on-line price of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point, non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

UNPREPARED SCRAP—Ceiling price is $8 a ton less than prepared base grades (No. 1 heavy & No. 1 RR heavy). Scrap suitable for compressing into No. 1 bundles is $6 less than No. 1 bundles; suitable for compressing into No. 2 bundles, $8 less than No. 2 bundles. For cast material requiring special preparation, price is breakable cast less preparation costs.

COMMISSIONS—Brokers are permitted a maximum of $1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: Nickel; $1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 5.25 pct. **Molybdenum**; $2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, $3 for content over 0.65 pct. **Manganese**; $4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., $14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. **Silicon**: electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. **Chromium**; $1 may be added if scrap conforms to SAE 52100 analysis. **Multiple Alloys**; if scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. For example, the price established for Grade 28 (wrought iron) may be charged only when sold to a producer of wrought iron. Otherwise the ceiling price shall not exceed the ceiling price for the corresponding grade of basic openhearth. Restrictions on use are placed on the following grades: Chemical borings, wrought iron and rerolling rails, cupola cast, billet, bloom, and forge crops, Nos. 1 and 2 chemical borings. Ceiling prices on billet bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer. NPA prohibits openhearth users from buying electric furnace grades, Nos. 11 through 18, foundry grades, Nos. 20 and 21 and cast grades, 1, 7, 9 and 11.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	$ 8.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	3.00
Bar crops and plate, cast steel, punchings and plate, cut structural and plate, 3 ft and under, foundry steel, 2 ft and under, wrought iron	10.00
Structural, plate scrap, 2 ft and less, foundry steel 1 ft and less	11.00
Structural and plate scrap, 1 ft and less	12.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

Hamilton, Ontario

(Consumers buying prices, del'd gross ton)

Hvy. melting steel	$35.00
No. 1 bundles	35.00
No. 2 bundles	34.50
Mechanical bundles	33.00
Mixed, steel scrap	31.00
Rails, remelting	35.00
Rails, rerolling	38.00
Bushelings	29.50
Bushelings, prepared new factory	33.00
Bushelings, unprepared new factory	28.00
Short steel turnings	28.00
Mixed borings, turnings	28.00
Cast scrap	58.00 to 60.00

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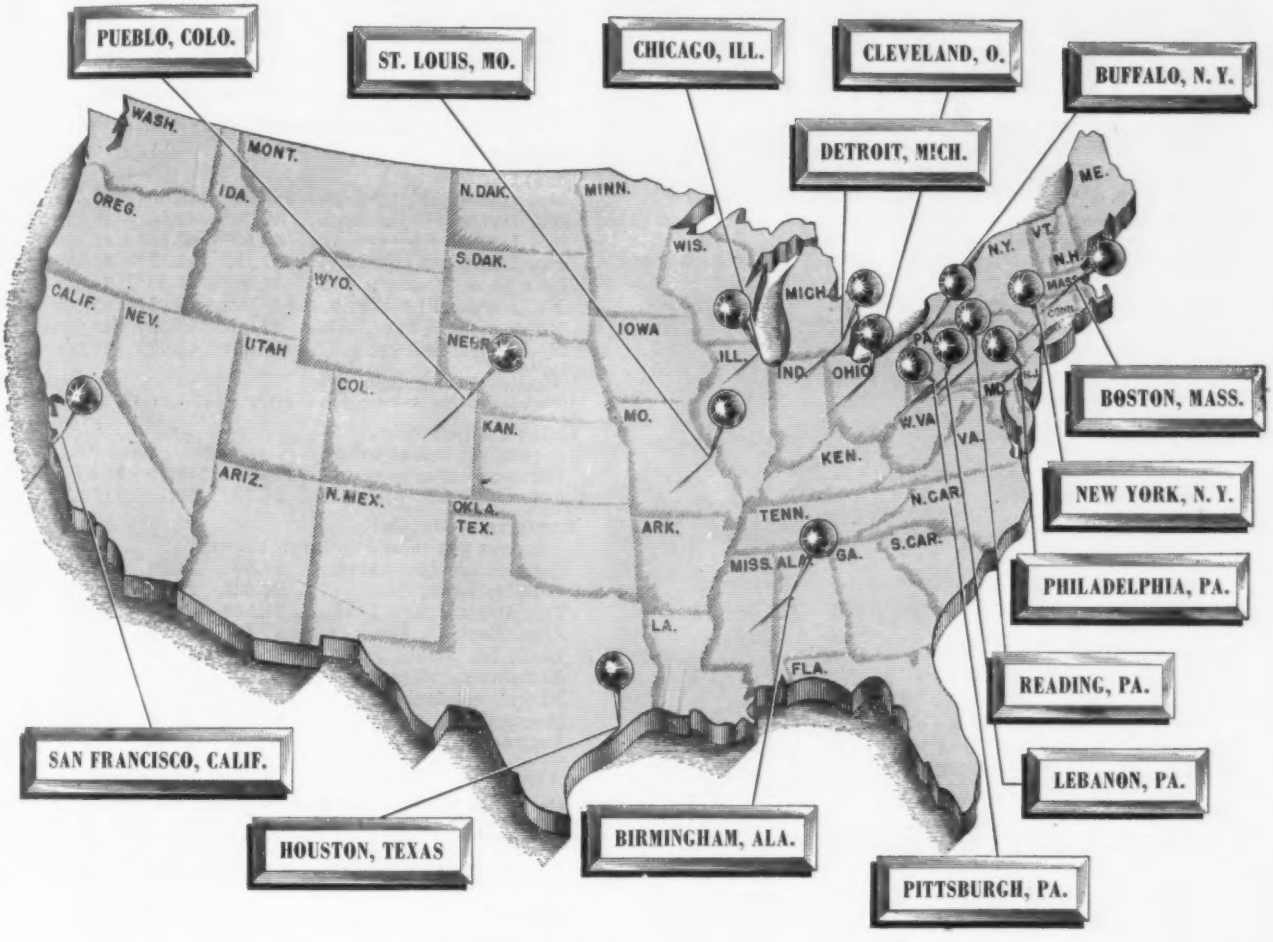

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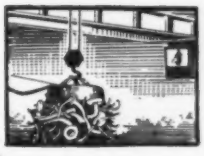

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	July 3, 1951	June 26, 1951	June 5, 1951	July 4 1950
Hot-rolled sheets	3.60	3.60	3.60	3.35
Cold-rolled sheets	4.35	4.35	4.35	4.10
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.40
Hot-rolled strip	3.50	3.50	3.50	3.25
Cold-rolled strip	4.75	4.75	4.75	4.21
Plate	3.70	3.70	3.70	3.50
.Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R-strip (No. 302)	36.50	36.50	36.50	33.00
Tin and Ternplate: (dollars per base box)				
Tinplate (1.50 lb.) cokes.	$8.70	$8.70	$8.70	$7.50
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	6.60
Special coated mfg. ternes	7.50	7.50	7.50	6.35
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.45
Cold finished bars	4.55	4.55	4.55	4.145
Alloy bars	4.30	4.30	4.30	3.95
Structural shapes	3.65	3.65	3.65	3.40
Stainless bars (No. 302)	31.25	31.25	31.25	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.85	4.85	4.85	4.50
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.40
Light rails	4.00	4.00	4.00	3.75
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$54.00
Slabs, rerolling	56.00	56.00	56.00	54.00
Forging billets	66.00	66.00	66.00	63.00
Alloy blooms billets, slabs	70.00	70.00	70.00	66.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	3.85
Skelp	3.35	3.35	3.35	3.15

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*

Pig Iron: (per gross ton)	July 3, 1951	June 26, 1951	June 5, 1951	July 1950
No. 2 foundry, del'd Phila.	$57.77	$57.77	$57.77	$50.42
No. 2, Valley furnace	52.50	52.50	52.50	46.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	49.08
No. 2, Birmingham	48.88	48.88	48.88	42.38
No. 2, foundry, Chicago†	52.50	52.50	52.50	46.50
Basic del'd Philadelphia	56.92	56.92	56.92	49.92
Basic, Valley furnace	52.00	52.00	52.00	46.00
Malleable, Chicago†	52.50	52.50	52.50	46.50
Malleable, Valley	52.50	52.50	52.50	46.50
Charcoal, Chicago	70.56	70.56	70.56	68.56
Ferromanganese‡	186.25	186.25	186.25	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$44.00*	$44.00*	$44.00*	$41.75
No. 1 steel, Phila. area	42.50*	42.50*	42.50*	33.75
No. 1 steel, Chicago	42.50*	42.50*	42.50*	37.50
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	37.50
Low phos. Young'n	46.50*	46.50*	46.50*	44.25
No. 1 cast, Pittsburgh	49.00†	49.00†	49.00†	43.75
No. 1 cast, Philadelphia	49.00†	49.00†	49.00†	39.50
No. 1 cast, Chicago	49.00†	49.00†	49.00†	45.50

*Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.25
Foundry coke, prompt	17.75	17.75	17.75	16.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	22.50
Copper, Lake, Conn.	24.625	24.625	24.625	22.625
Tin, Straits, New York	$1.06†	$1.06	$1.36	79.75
Zinc, East St. Louis	17.50	17.50	17.50	15.00
Lead, St. Louis	16.80	16.80	16.80	10.80
Aluminum, virgin	19.00	19.00	19.00	17.50
Nickel, electrolytic	59.58	50.58	59.58	51.22
Magnesium, ingot	24.50	24.50	24.50	21.50
Antimony, Laredo, Tex.	42.00	42.00	42.00	24.50

†Tentative. *Revised.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

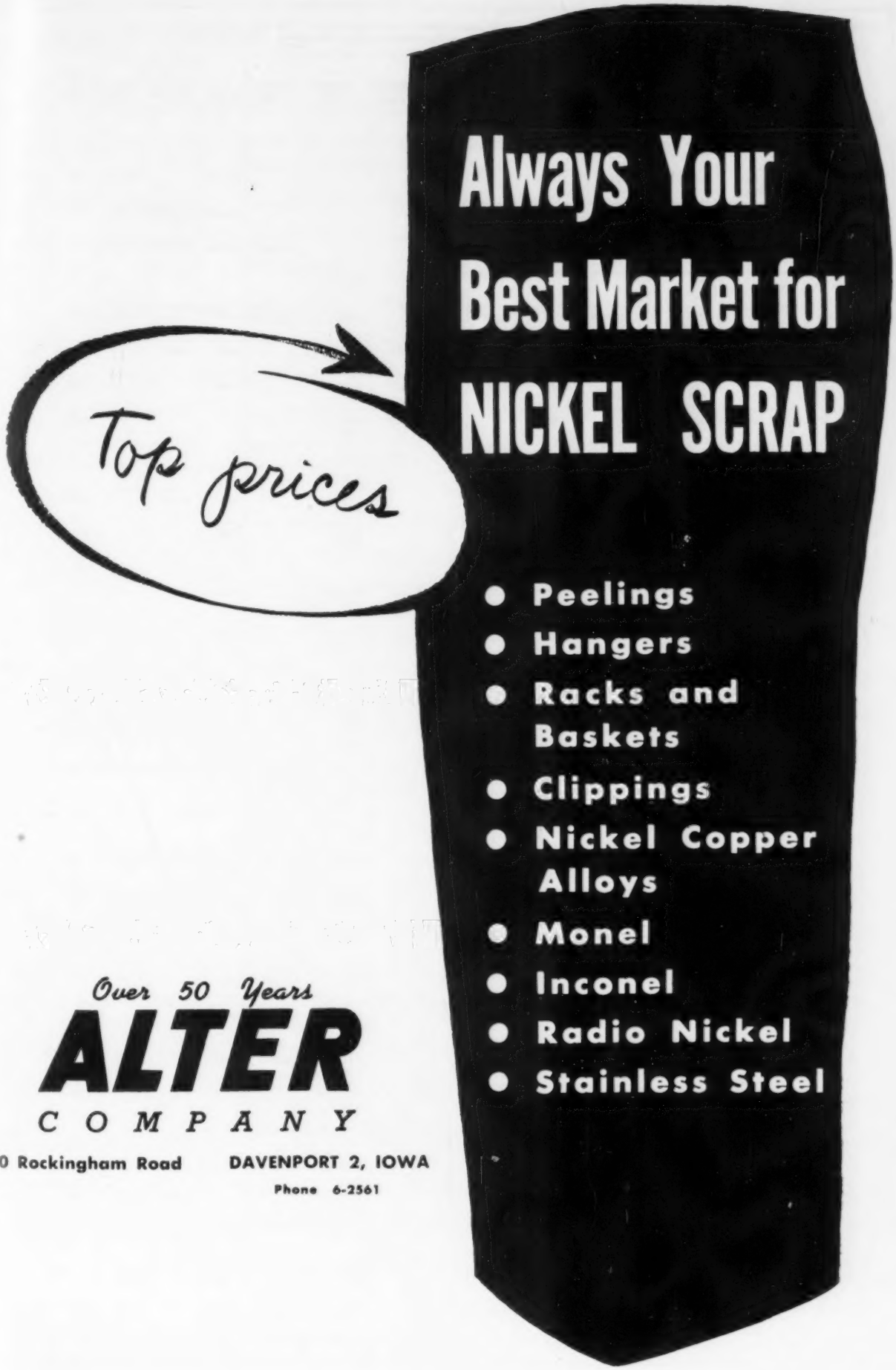
	Finished Steel Base Price	Pig Iron	Scrap Steel
July 3, 1951	4.131¢ per lb.	$52.69 per gross ton	$43.00 per gross ton
One week ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton
One month ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton
One year ago	3.837¢ per lb.	46.38 per gross ton	37.67 per gross ton

	Finished Steel Base Price High		Finished Steel Base Price Low		Pig Iron High		Pig Iron Low		Scrap Steel High		Scrap Steel Low	
1951	4.131¢	Jan. 2	4.131¢	Jan. 2	$52.69	Jan. 2	$52.69	Jan. 2	$47.75	Jan. 30	$43.00	Feb. 7
1950	4.131¢	Dec. 1	3.837¢	Jan. 3	52.69	Dec. 12	45.88	Jan. 3	45.13	Dec. 19	26.25	Jan. 9
1949	3.837¢	Dec. 27	3.3705¢	May 3	46.87	Jan. 18	45.88	Sept. 6	43.00	Jan. 4	19.33	June 28
1948	3.721¢	July 27	3.193¢	Jan. 1	46.91	Oct. 12	39.58	Jan. 6	43.16	July 27	39.75	Mar. 9
1947	3.193¢	July 29	2.848¢	Jan. 1	37.98	Dec. 30	30.14	Jan. 7	42.58	Oct. 28	29.50	May 20
1946	2.848¢	Dec. 31	2.464¢	Jan. 1	30.14	Dec. 10	25.37	Jan. 1	31.17	Dec. 24	19.17	Jan. 1
1945	2.464¢	May 29	2.396¢	Jan. 1	25.37	Oct. 23	23.61	Jan. 2	19.17	Jan. 2	18.92	May 22
1944	2.396¢		2.396¢		$23.61		$23.61		19.17	Jan. 11	15.76	Oct. 24
1943	2.396¢		2.396¢		23.61		23.61		$19.17		$19.17	
1942	2.396¢		2.396¢		23.61		23.61		19.17		19.17	
1941	2.396¢		2.396¢		$23.61	Mar. 20	$23.45	Jan. 2	$22.00	Jan. 7	$19.17	Apr. 10
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30	16.04	Apr. 9
1939	2.35367¢	Jan. 3	2.26689¢	May 16	22.61	Sept. 19	20.61	Sept. 12	22.50	Oct. 3	14.08	May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25	June 21	19.61	July 6	15.00	Nov. 22	11.00	June 7
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4	32.25	Mar. 9	20.25	Feb. 16	21.92	Mar. 30	12.67	June 9
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10	19.74	Nov. 24	18.73	Aug. 11	17.75	Dec. 21	12.67	June 8
1932	1.89196¢	July 5	1.83910¢	Mar. 1	14.81	Jan. 5	13.56	Dec. 6	8.50	Jan. 12	6.43	July 5
1929	2.31773¢	May 28	2.26498¢	Oct. 29	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29	14.08	Dec. 9

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.



Over 50 Years

ALTER

COMPANY

1700 Rockingham Road DAVENPORT 2, IOWA

Phone 6-2561

IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[1]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,5]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,5]	$66.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$66.00[3,4]	$73.00[26]	$66.00[3]			$66.00[1]
Alloy, net ton	$70.00[1,17,5]	$70.00[1,4]	$70.00[1,5]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[26]	$70.00[3]			$73.00[1]
PIPE SKELP	3.35[1] 3.45[5]						3.35[1,4]							
WIRE RODS	4.10[2] 4.30[18]	4.10[2,4,33]	4.10[6]	4.10[2]			4.10[6]		4.10[35]		4.10[3]	4.20[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,5,9,15] 3.75[28]	3.60[6,23]	3.60[1,6,8]	3.60[4,5]		3.60[7]	3.60[1,4,6] 4.00[13]		3.60[3]	4.00[26]		3.60[3]	4.30[22]	3.80[13] 4.40[47]
Cold-rolled	4.35[1,5,9,15,7]		4.35[1,6,8]	4.35[4,5]		4.35[7]	4.35[4,6]		4.35[3]			4.35[3]	5.05[22]	4.55[13]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,8]		4.80[4]	4.80[7]	5.50[44] 6.00[64]					4.80[3]	5.50[22]	
Enameling (12 gage)	4.65[1]		4.65[1,8]	4.65[4]		4.65[7]	4.65[6]						5.35[22]	
Long terne (10 gage)	5.20[9,15]		5.20[1]			5.20[7]	6.00[64]							
Hi str. low alloy, h.r.	5.40[1,5] 5.75[9]	5.40[1]	5.40[1,6] 5.90[6]	5.40[4,5]			5.40[1,4,13] 5.90[6]		5.40[3]	5.65[26]		5.40[3]		5.95[13]
Hi str. low alloy, c.r.	6.55[1,5] 6.98[9]		6.55[1,8] 7.05[6]	6.55[4,5]			6.55[4] 7.05[6]		6.55[3]			6.55[3]		7.10[13]
Hi str. low alloy, galv.	7.20[1]											6.75[3]		
STRIP Hot-rolled	3.60[9], 4.00[41,58], 3.75[28] 3.50[5,7]	3.50[66]	3.50[1,6,8]			3.50[7]	3.50[1,4,6] 4.00[13]		3.50[3,4]	3.90[26]	3.50[3]	3.50[3]		4.40[47] 3.80[13]
Cold-rolled	4.65[4,7,9] 5.00[28] 5.35[40,63,58]	4.90[6,66]	4.90[6]	4.65[2,5]		4.65[7]	4.65[4,6] 5.25[48,49] 5.35[13,40]		4.65[3]			4.65[3]		4.85[13] 5.45[47] 5.90[48,61]
Hi str. low alloy, h.r.	5.75[9]		5.50[1] 5.30[6], 5.80[6]				4.95[4], 5.50[1] 5.40[13], 5.80[6]		4.95[3]	5.55[26]		4.95[3]		5.95[13]
Hi str. low alloy, c.r.	7.20[9]			{6.55[2] 6.70[5]			{6.20[4], 6.55[13] 7.05[6]		6.40[3]			6.40[3]		
TINPLATE† Cokes, 1.25-lb base box (1.50 lb, add 25¢)	$8.45[1,5,9,15]		$8.45[1,6,8]				$8.45[4]					$8.55[3]		
Electrolytic 0.25, 0.50, 0.75 lb box	0.25 lb base box, $7.15[1,4,5,8,9]; $7.25[3,11]; $7.35[32] 0.50 lb, add 25¢; 0.75 lb add 65¢													
BLACKPLATE, 29 gage Hollowware enameling	5.85[1] 6.15[18]		5.85[1]				5.30[4]							
BARS Carbon steel	3.70[1,5] 3.85[9]	3.70[1,4,23]	3.70[1,4,6,8]	3.70[4]	3.70[4]		3.70[1,4,6]		3.70[3,4]		3.70[3]			3.85[31]
Reinforcing	3.70[1,5]	3.70[4]	3.70[1,6,8]	3.70[4]			3.70[1,4,6]		3.70[3,4]		3.70[3]	3.70[3]		
Cold-finished	4.55[2,4,5,52,69,71]	4.55[2,23,70]	4.55[4,74,73]	4.55[2]	4.55[4,32]		4.55[6,57]		4.60[70]					4.70[64]
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,23]	4.30[1,6,8]		4.30[4]		4.30[1,6]	4.30[6]	4.30[3,4]		4.30[3]			4.45[31] 4.65[12]
Alloy, cold-drawn	5.40[17,52,69,71,2]	5.40[4,23,69,70,73] 5.45[2]	5.40[4,73,74]		5.40[4,32]		5.40[6,35,57]	5.40[3]	5.40[3]					5.55[64]
Hi str. low alloy, h.r.	5.55[1,5]		5.55[1,6] 6.05[6]	5.55[4,5]			5.55[1] 6.05[6]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,5,15] 4.00[9]	3.70[1,23]	3.70[1,6,8]	3.70[4,5]			3.70[1,4,6] 3.95[13]		3.70[3]	4.15[26]	3.70[3]	3.70[3]	4.40[22]	
Floor plates	4.75[1]	4.75[1]	4.75[6]	4.75[5]						4.75[26]				
Alloy	4.75[1]	4.75[1]	4.75[1]				5.20[13]			5.05[26]	4.75[3]	4.75[3]		
Hi str. low alloy	5.65[1,5]	5.65[1]	5.65[1,6] 6.15[6]	5.65[4,5]			{5.65[4] 5.70[13] 6.15[6]			5.90[26]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,5] 3.90[9]	3.65[1,23]	3.65[1,6]					3.70[3]	3.70[3]		3.70[3]			
Hi str. low alloy	5.50[1,5]	5.50[1]	5.50[1,6] 6.00[6]				6.00[6]	5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[2,5] 5.10[18]	4.85[2] 4.33,34		4.85[2]			4.85[6]	Kokomo—4.95[30] 4.85[35]			4.85[3]	4.95[3]	Duluth—4.85[3]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[6]						4.45[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS Carbon forging, net ton
	$82.00[83]		F=$80.00[19]		Alloy, net ton
		$56.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[83]	$66.00[11]	F=$85.00[19] SF, LS, S=$85.00[62]	Geneva=$86.00[16]	Carbon forging billets, net ton
	$78.00[83]		F=$89.00[19] LA=$90.00[62]		Alloy net ton
					PIPE SKELP
	4.50[83]	4.10[4,11]	SF=4.90[2], F=4.90[19] LA=4.90[24,62]	Worcester=4.46[2] Minnequa=4.35[14] Portsmouth=4.30[20]	WIRE RODS
		3.60[4,11]	SF, LA=4.30[24] F=4.55[19]	Niles=5.25[84], Geneva=3.70[16] Ashland=3.60[7]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[24] F=5.30[19]		Cold-rolled
		4.80[4,11]	SF, LA=5.55[24]	Ashland=4.80[7] Kokomo=5.20[30]	Galvanized (10 gage)
				Ashland=4.65[7]	Enameling (12 gage)
					Long ternes (10 gage)
		5.40[11]	F=6.35[19]		Hi str. low alloy, h.r.
			F=7.50[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
4.10[83]	4.90[83]	3.50[4,11]	SF, LA=4.25[24,62] F=4.75[19], S=4.50[62]	Atlanta=4.05[85] Minnequa=4.55[14] Ashland=3.50[7]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[27]	New Haven=5.15[3], 5.85[58] Trenton=6.00[45]	Cold-rolled
		5.30[11]	F=6.20[19] SF, LA=6.05[62] S=6.30[62]		Hi str. low alloy, h.r.
			F=6.95[19]		Hi str. low alloy, c.r.
		$8.55[11]	SF=9.20[24]		TINPLATE Cokes, 1.25-lb base box (1.50 lb, add 25¢)
					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.30[83]	4.10[83]	3.70[4,11]	SF, LA=4.40[24]	Atlanta=4.25[85] Minnequa=4.15[14]	BARS Carbon steel
4.38[83]	4.10[83]	3.70[4,11]	SF, S=4.45[62] F=4.40[19], LA=4.40[63]	Atlanta=4.25[85] Minnequa=4.50[14]	Reinforcing
			LA=6.00[4]	Newark=5.00[89] Putnam=5.10[89] Hartford=5.10[4]	Cold-finished
4.90[83]	4.70[83]		LA=5.35[62] F=5.35[19]		Alloy, hot-rolled
				Newark=5.75[89] Worcester=5.75[2] Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19] SF, S=6.30[62] LA=6.25[62]		Hi str. low alloy, h.r.
	4.10[83]	3.70[4,11]	F=4.30[19] S=4.60[62]	Claymont=4.15[20] Coatesville=4.15[21] Minnequa=4.50[14] Geneva=3.70[16]	PLATE Carbon steel
				Harrisburg=5.25[35]	Floor plates
			F=5.70[19]	Coatesville=5.25[21] Claymont=4.85[20]	Alloy
		5.65[11]	F=6.25[19] S=6.55[62]	Geneva=5.85[16]	Hi str. low alloy
4.25[83]	4.05[83]	3.60[4] 3.65[11]	SF=4.20[62] F=4.25[16] LA=4.25[24,62] S=4.30[62]	Geneva 3.65[16] Minnequa 4.10[14]	SHAPES, Structural
		5.50[11]	SF=6.10[62,19] SF=6.00[62] LA=6.05[62]	Geneva=5.50[16]	Si str. low alloy
5.45[83]	5.25[83]	4.85[4,11]	SF, LA=5.80[24]	Atlanta=5.10[85] Worcester=5.15[2] Minnequa=5.10[14] Portsmouth=5.25[20]	MANUFACTURERS' WIRE Bright

†Special coated mfg ternes deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $2.20 from 1.25-lb coke base box.

Key to Steel Producers

1 U. S. Steel Co., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calstrip Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Claymont Steel Corp., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling St. & Carbide Corp., McKeesport
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Fran.
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wycoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind.
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.
91 Woodward Iron Co., Woodward, Ala.
92 Sloss-Sheffield Steel & Iron Co., Birmingham
93 Hanna Furnace Corp., Detroit
94 Interlake Iron Corp., Cleveland
95 Lone Star Steel Co., Dallas
96 Mystic Iron Works, Everett, Mass.
97 Jackson Iron & Steel Co., Jackson, O.
98 Globe Iron Co., Jackson, O.
99 Pittsburgh Coke & Chemical Co., Pittsburgh
100 Shenango Furnace Co., Pittsburgh
101 Tennessee Products & Chem. Corp., Nashville
102 Koppers Co., Inc., Granite City, Ill.
103 Page Steel & Wire Div., American Chain & Cable, Monessen, Pa.
104 Wallingford Steel Co., Wallingford, Conn.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.00	16.50	16.00	24.25	19.75	21.50	12.75	14.75	13.00
Slabs, billets rerolling	18.50	19.75	21.75	20.75	31.75	26.00	28.25	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.00	36.50	35.50	52.50	40.00	44.50	28.00	28.50	28.50
Billets, forging	26.25	26.25	28.25	27.50	41.00	31.00	34.75	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.25	33.75	32.75	48.75	36.75	41.25	25.75	26.25	26.25
Plates	33.00	33.00	35.00	35.00	51.50	40.50	45.00	27.00	27.50	27.50
Sheets	41.00	41.00	43.00	43.00	56.50	49.00	53.50	36.50	37.00	39.00
Strip, hot-rolled	26.50	29.00	32.25	30.00	48.25	36.75	41.00	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.50	40.00	38.50	58.50	48.00	52.00	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind, 67; Lockport, N. Y., 45.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13; Butler, Pa., 7; Wallingford, Conn., 104.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28; Monessen, 103; Syracuse, N. Y., 17; Bridgeville, Pa., 59.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44; Syracuse, N. Y., 17.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28; Washington, Pa., 39.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1; Syracuse, N. Y., 17.

(Does not reflect latest increase.)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer-1	3.60	4.00	4.70					
Chicago-4				6.15				
Ensley-11	3.60	4.00						
Fairfield-11		4.00	4.40			8.60	4.50	
Gary-1	3.60	4.00					4.50	
Ind. Harbor-8	3.60		4.70	6.15	5.60	8.60	4.50	
Johnstown-3		4.00			5.60	8.60		
Joliet-1		4.00	4.70					
Kansas City-83				6.40				9.85
Lackawanna-3	3.60	4.00	4.70			8.60	4.50	
Lebanon-3				6.15				9.85
Minnequa-14	3.60	4.50	4.70	6.15		8.60	4.50	9.85
Pittsburgh-77						9.35		9.85
Pittsburgh-78								9.85
Pittsburgh-5				6.15				
Pittsburgh-24							4.65	
Seattle-62				6.65			4.65	
Steelton-3	3.60		4.70				4.50	
Struthers-6				6.15				
Torrance-24							4.65	
Youngstown-4				6.15				

BOILER TUBES

$ Per 100 ft., cut, 10 to 24 ft.

F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	22.67	28.66	21.99	26.8
	2½	12	30.48	35.84	29.57	34.7
	3	12	33.90	39.90	32.89	38.7
	3½	11	42.37	49.89	41.10	48.3
	4	10	52.80	61.88	51.03	60.0
National Tube	2	13	21.62	26.48		
	2½	12	29.65	36.32		
	3	12	34.00	41.64		
	3½	11	40.34	49.41		
	4	10	51.21	62.72		
Pittsburgh Steel	2	13		27.08		
	2½	12	30.49	37.15		
	3	12	34.95	42.59		
	3½	11	41.48	50.54		
	4	10	52.65	64.16		

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:
70% or more $43.00
60% or less 40.00

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago.	$105.30 to $108.80
6 to 24-in., del'd N. Y.	108.50 to 109.50
6 to 24-in., Birmingham.	91.50 to 96.00
6-in and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	123.00 to 130.00

Class "A" and as pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. (1) ¢/lb.
Alabama City-4	118	126		123		136	5.70	5.95
Aliquippa, Pa.-5	118	132			136	140	5.70	6.15
Atlanta-65	121	133		126	126	143	5.95	6.40
Bartonville-34	118	130		123	143	143	5.70	6.15
Buffalo-85							4.85	
Cleveland-86	125							
Cleveland-2							5.70	6.15
Crawfordsville-87		132				145	5.95	6.40
Donora, Pa.-2	118	130		123	140	140	5.70	6.15
Duluth-2	118	130		123	140	140	5.70	6.15
Fairfield, Ala.-11	118	130		123		140	5.70	6.15
Houston-83	126	138				148	6.10	6.55
Johnstown, Pa.-3	118	130			140		5.70	6.15
Joliet, Ill.-2	118	130		123		140	5.70	6.15
Kokomo, Ind.-30	120	132		125	138	142	5.80	6.05
Los Angeles-62							6.65	
Kansas City-83	130			135		152	6.30	6.75
Minnequa-14	123	138	130	128	146	146	5.95	6.45
Monessen-18	124	135				145	5.95	6.40
Moline, Ill.-4			136					
Pittsburg, Cal.-24	137			147	156	160	6.65	6.80
Portsmouth-20	124	137			147	147	6.10	6.60
Rankin, Pa.-2	118	130			140	140	5.70	6.15
So. Chicago, Ill.-4	118	126	140	123		136	5.70	5.95
S. San Fran.-14				147		160	6.65	7.10
Sparrows Pt.-3	120			125	142	142	5.80	6.25
Sterling, Ill.-33	118	130		123	140	140	5.70	6.15
Struthers, Ohio-6							5.70	6.15
Torrance, Cal.-24	138						6.65	
Worcester-2	124						6.00	6.45
Williamsport, Pa.-51			150					

Cut Nails, carloads, base, $7.35 per 100 lb (less 20¢ to jobbers), at Conshohocken, Pa., (26), Wheeling, W. Va., (15), $7.15.

(1) Alabama City and So. Chicago do not include zinc extra.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD ½ In. Blk.	½ In. Gal.	¾ In. Blk.	¾ In. Gal.	1 In. Blk.	1 In. Gal.	1¼ In. Blk.	1¼ In. Gal.	1½ In. Blk.	1½ In. Gal.	2 In. Blk.	2 In. Gal.	2½-3 In. Blk.	2½-3 In. Gal.	SEAMLESS 2 In. Blk.	2 In. Gal.	2½-3 In. Blk.	2½-3 In. Gal.	3½-4 In. Blk.	3½-4 In. Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0						
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0						
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0						
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
St. Louis-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0						
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0						
Pittsburgh-88	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5		32.5		34.5	
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0						
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5						
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0						
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0						
Oakland-19	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0						
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	15.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
St. Louis-32	34.5	14.0	38.5	18.0	40.5	21.5	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0						
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0						
Pittsburgh-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0		33.0		36.5	
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0						
Wheatland-89	35.5	13.5	39.5	17.5	41.5	9.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5						
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	26.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb. *(Metropolitan area delivery add 20¢ except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢).

Cities	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.60	6.84	7.49[3]–8.07	6.04	.....	5.80	6.14	6.04	6.84–6.89	10.24	10.54	11.89	12.19
Birmingham*	5.60	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00–7.25	7.74–8.29	6.15	8.50[4]	6.48–6.78	6.20	6.05	6.79–6.84	10.25	10.55	11.90–12.00	12.20–12.30
Buffalo	5.60	6.40	7.74–8.09	5.86	.....	6.05	5.90	5.60	6.40–6.45	10.15–10.85	10.45	11.80	11.95–12.10
Chicago	5.60	6.40	7.75	5.55	.....	5.80	5.70	5.55	6.30	9.80	10.10	11.45	11.75
Cincinnati*	5.87	6.44	7.39	5.80	.....	6.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.56	11.86
Detroit	5.78	6.53	7.89	5.94	.....	5.99	6.09	5.84	6.56	10.11	10.41	11.76	12.06
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.65	9.35	10.35	11.25	.....	12.75
Indianapolis, del'd.	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	9.45[6]	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33–6.38	7.08–7.18	.....	6.33–6.38	.....	6.43–8.02	6.33–6.48	6.08–6.33	7.16–7.32	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89	5.69–6.59	.....	5.94	5.84	5.69	6.44–6.54	9.94	10.24	11.59	11.88
New Orleans*	5.70	6.59	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67–5.97	7.19[5]–7.24[1]	8.14[2]	6.29–6.89	8.63[4]	6.28–6.58	6.10	6.12	6.99	10.05–10.15	10.35–10.45	11.70–11.80	12.10–12.20
Norfolk	6.50[3]	.....	.....	.....	.....	6.50[3]	6.60[3]	6.55[3]	.....	.....	.....	.....	.....
Philadelphia*	5.90	6.80	8.00	6.10	.....	6.05	5.90	6.05	6.86	9.90	10.20	.....	.....
Pittsburgh	5.60	6.40	7.75	5.65–5.95	.....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60–7.55	8.95	8.50–9.10	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.95	.....	9.70–10.50[2]	8.70–8.75	.....	8.05	6.75–8.30	7.95–8.65	9.00	.....	.....	.....	.....
San Francisco*	6.65	8.05[2]	8.55–8.90[2]	6.60	9.95[6]	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.80	9.20	9.05	.....	6.75	6.65	6.75	9.05	.....	.....	.....	.....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.00[4]–8.28	6.13	6.03	5.80	6.55–6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.96	8.31	6.11	.....	6.36	6.26	6.11	6.96	10.36	10.66	12.01	12.31

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb; (6) 2000 to 5999 lb.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham-4	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-91	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-92	48.38	48.88	.....	.....	.....	.....	.....
Buffalo-4	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo-93	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago-94	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland-2	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland-4	52.00	52.50	52.50	.....	.....	.....	.....
Daingerfield, Tex.-95	48.00	48.50	48.50	.....	.....	.....	.....
Duluth-94	52.00	52.50	52.50	53.00	.....	.....	.....
Erie-94	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass.-96	.....	51.75	52.25	.....	.....	.....	.....
Fontana-19	58.00	58.50	.....	.....	.....	.....	.....
Geneva, Utah-16	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill.-102	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, Ohio-6	52.00	52.50	52.50	.....	.....	.....	.....
Ironton, Utah-16	52.00	52.50	.....	.....	.....	.....	.....
Jackson, Ohio-97, 98	.....	.....	.....	.....	.....	62.50	.....
Lyle, Tenn.-101	.....	.....	.....	.....	.....	.....	66.00
Manessen-18	54.00	.....	.....	.....	.....	.....	.....
Neville Island-99	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh-1	52.00	.....	.....	53.00	.....	.....	.....
Sharpsville-100	52.00	52.50	52.50	53.00	.....	.....	.....
Shelton-3	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland-26	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo-84	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y.-4	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown-6	52.00	52.50	52.50	53.00	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct, except low phos. 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

REFRACTORIES

Fire Clay Brick *(F.o.b. works) Carloads, Per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Chester	$82.00

Magnesite Brick

Standard, Baltimore	$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite *St. %-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed	$62.70
Domestic, f.o.b. Chewelah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	$13.00

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.69
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd.	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

LAKE SUPERIOR ORES

(51.50% *Fe; natural content, delivered lower lake ports*) *Per gross ton*

Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

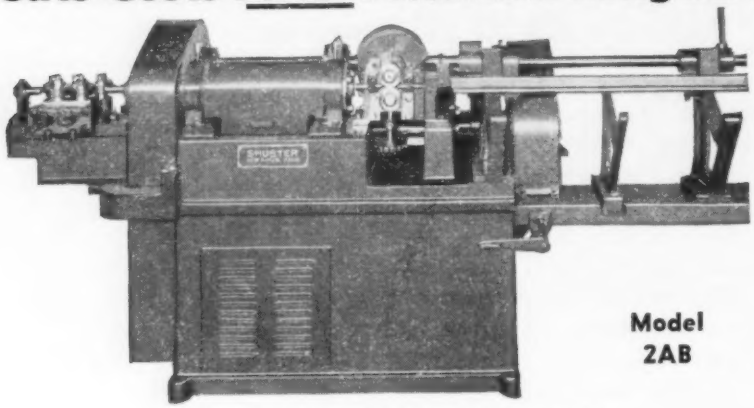
C-R SPRING STEEL

F.o.b. Mill Cents Per Lb.	CARBON CONTENT				
	0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn.-58	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa.-41	.....	6.80	7.40	9.35	11.65
Cleveland-2	4.65	6.45	7.40	9.35	11.65
Detroit-68	5.60	6.65	7.25	.....	.....
New Castle, Pa.-40	5.35	6.80	7.40	9.35	.....
New Haven, Conn.-68	5.85	6.75	7.35	.....	.....
Sharon, Pa.-13	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va.-9	5.35	6.80	7.40	9.35	11.65
Worcester, Mass.-2	4.95	6.75	7.70	9.65	11.65
Youngstown-48	.....	6.80	7.40	9.35	11.65

This New, Economical

SHUSTER

Cuts Costs AND Accurate Lengths!



Model 2AB

Capacity 3/16" dia.—⅜" dia. (BASIC WIRE)

Automatic

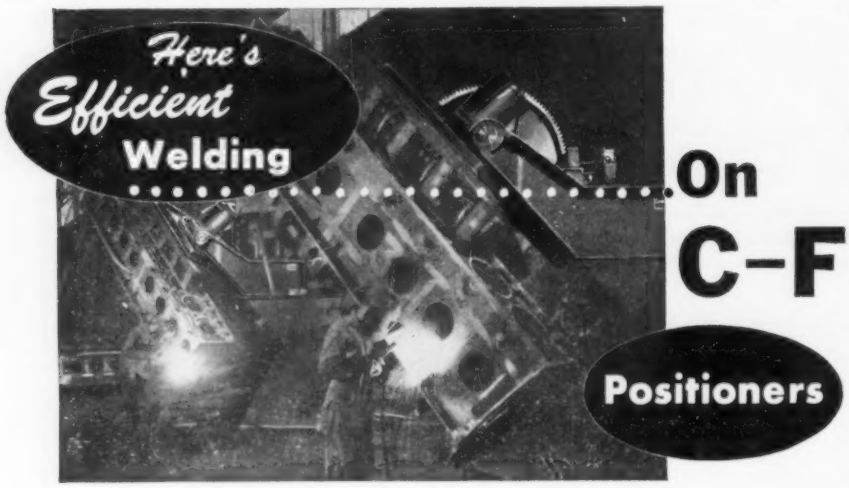
WIRE STRAIGHTENING AND CUTTING MACHINE

This new "SHUSTER"—with its five gear-driven straightening rolls—handles even badly twisted wire with ease. Square and rectangular as well as round wire may be straightened and cut to exact lengths. Other "Shuster" features that assure high speed, quality production are: almost continuous wire travel, rapid cut-off, V-belt motor drive, ball and roller bearings, and extreme rigidity throughout. Write for details.

Mfd. by METTLER MACHINE TOOL, INC.

132E Lawrence St. New Haven, Conn.

Representatives in all principal cities and foreign countries.



When heavy, unwieldy weldments like these diesel crankcases can be quickly swung into any position so that every weld is made *downhand*—that's efficient welding!

Welders spend more time welding—do better welding at lower cost when they work with C-F Positioners because these hand and/or power operated machines reduce positioning time to a minimum. Investigate the cost-saving advantages of C-F Positioners. They pay their way in any company.

Write for Bulletin WP24 — an illustrated circular detailing the Specific advantages of C-F Positioners.

CULLEN-FRIESTEDT CO.
1303 S. Kilbourn Ave., Chicago 23

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.

C-F positioned welds mean better, more economical welds

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in...	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List Less Keg (Reg.)	K.	Less Keg (Hvy.)	K.
½ in. & smaller.	15	28½	15	28½
9/16. in. & ⅝ in..	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger.	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller.	26	37	22	34
9/16 in. & ⅝ in..	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger.	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller.	26	37	22	34
9/16 in. & ⅝ in..	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	13	25
1⅝ in. & larger.	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller.	35	45	28½	39½
9/16 in. & ⅝ in..	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger.	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts

Pct Off List

Packaged, steel, plain finished	48—10
Packaged, plated finish	31—10
Bulk, plain finish**	62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

Base per 100 lb.

½ in. & larger	$7.85
Pct Off List	
7/16 in. & smaller	30

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(In bulk) *Pct Off List*

Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	18
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam and smaller x 6 in. & shorter	61

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.55

ELECTRODES

Cents per lb., f.o.b. plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. (21)	*29.5	
Washgtn, Pa. (39)	*29.5	
Claymont, Del. (29)	*28.00	
Conshohocken, Pa. (26)		*27.50
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon		
10 pct Coatesville (21)	32.5	
Inconel-carbon		
10 pct Coatesville (21)	40.5	
Monel-carbon		
10 pct Coatesville (21)	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.235
18	4	1	—	5	$1.36
18	4	2	—	—	$1.38
1.5	4	1.5	8	—	78.5¢
6	4	2	6	—	87¢

High-carbon chromium ..... 63.5¢
Oil hardened manganese..... 35¢
Special carbon ..... 32.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags... 7.4¢ to 9.0¢
Canadian sponge iron, del'd In East ..... 10.00¢
Domestic sponge iron, 98+% Fe, carload lots ..... 15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe ..... 42.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe 53.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe 63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe 83.0¢ to $1.48
Aluminum ..... 31.5¢
Brass, 10 ton lots ..... 30.00¢ to 33.25¢
Copper, electrolytic..10.75¢ plus metal value
Copper, reduced ...10.00¢ plus metal value
Cadmium, 100-199 lb ..95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd $3.50
Lead .....7.5¢ to 12.0¢ plus metal value
Manganese ..... 57.0¢
Molybdenum, 99% $2.75
Nickel, unannealed ..... 88.0¢
Nickel, annealed ..... 95.0¢
Nickel, spherical, unannealed 92.0¢
Silicon ..... 38.5¢
Solder powder..7.0¢ to 9.0¢ plus met. value
Stainless steel, 302 ..... $3.00¢
Stainless steel, 316 ..... $1.10
Tin .....14.00¢ plus metal value
Tungsten, 99% (65 mesh).. $6.00
Zinc, 10 ton lots ..... 23.0¢ to 30.5¢

ARMSTRONG *Drop Forged* **LATHE DOGS**

ARMSTRONG Lathe Dogs give extra service because they are drop forged from selected open hearth steel, and are heat treated to extreme toughness and stiffness. Hubs are made large enough to permit re-tapping, screws are also of special analysis steel and are hardened at the point to prevent upsetting. ARMSTRONG Dogs come in 10 types with square head or safety headless screws, with straight or bent tails. They are carried in stock by your local ARMSTRONG Distributor.

Write for Catalog

ARMSTRONG BROS. TOOL CO.
5209 West Armstrong Ave., Chicago 30, Ill.
New York and San Francisco

..for punching, slotting and notching of plates

One-man Operation; Positive Control; Quick, Accurate Positioning

Where runs are too short to justify the use of a spacing table, or where irregular plates must be handled, this modern Thomas Duplicator is ideally adapted. It affords rapid, precision duplication of holes, notches or slots, and will speed production in car-shops, bus and truck building plants and in numerous other fabricating operations in varied industries.

Write for Bulletin 312

PUNCHES · SHEARS · PRESSES
BENDERS · SPACING TABLES

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH 25, PA.

1A

KRANE KAR swings loads to either side

KRANE KAR WILL DO ANY JOB IN AND AROUND YOUR PLANT

KRANE KAR handles spare blooms for Blooming Mill, large slabs for Rolling Mill, charge boxes in Open Hearth, bars in Cold Drawn Bar Mill (finally loads them into railroad cars), changes rolls and bumper plates in Steel Strip Mill, and stands by to relieve heavy duty overhead cranes; transports all kinds of loads in Machine Shop, Construction and Maintenance Depts. With clamshell bucket, **KRANE KAR** moves sand in Welding and Foundry Depts., and coke in Coke Dept. *Ask for illustrated Bulletin 89—"How Metalworking Plants Reduce Materials Handling Costs."*

Gas or diesel, 12 to 37 ft. booms or adjustable telescopic booms; solid or pneumatic rubber tires. Buckets, magnets, and other accessories available.

THE ORIGINAL SWING BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

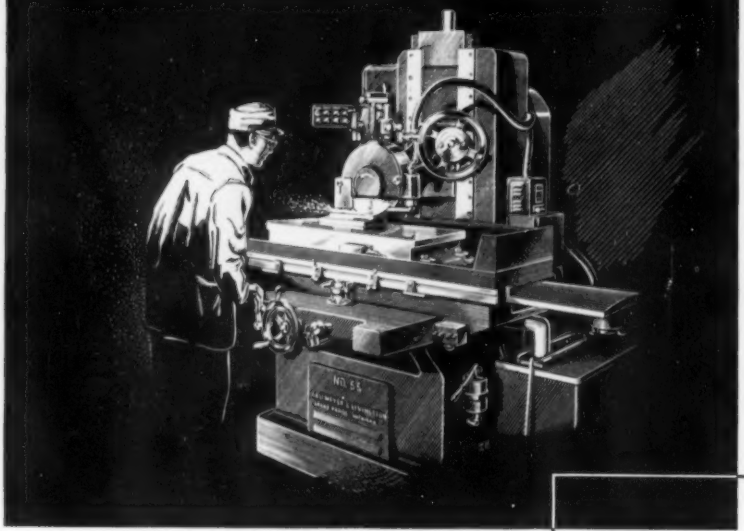
1½, 2½, 5, AND 10 TON CAPACITIES

KRANE KAR TRADE MARK REGISTERED

USERS: Carnegie-Illinois, U.S. Steel, Bethlehem, Youngstown S & T, Basic Magnesium, Lima Locomotive, General Motors, Pullman Standard, etc.

SILENT HOIST & CRANE CO. 851 63rd ST., BROOKLYN 20, N.Y.

WHEN THE DECISION IS PRECISION...



Where extreme tolerances are not required, the choice of any particular grinding machine may not be too important. But, where absolute precision is demanded, the choice is usually *Grand Rapids.*

Defense orders make it impossible to fill orders as quickly as we desire—but we know our customers can appreciate the reasons for delay As always we'll do our best to serve you.

GALLMEYER & LIVINGSTON CO.
200 Straight Ave., Grand Rapids, Mich.

Grand Rapids Grinders
—World's finest

GALLMEYER & LIVINGSTON

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech-Bottom-15	.....	7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge-28	.....	7.25	8.50	9.30	9.85	.....	.....
Follansbee-63	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granity City-22	.....	7.95	9.20	.....	.....	.....	.....
Ind. Harbor-3	6.75	7.25	.....	.....	.....	.....	.....
Mansfield-75	7.25	7.75	9.00	9.80	.....	.....	.....
Niles, O.-64	7.05	7.55	.....	.....	.....	.....	.....
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O.-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si.			22.60

Foundry Ferrochrome

Contract prices, cents per lb of alloy. Noncontract prices add 2.50¢ per lb.

High carbon 8 Mesh and down.

62 to 66% Cr, 5 to 7% C, 7 to 10% Si.

Carloads, bulk	23.25
Carloads, packed	24.15
Ton lots, packed	27.25

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.10% max. C.	$1.14
0.50% max. C.	1.10
9 to 11% C.	1.08

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.00¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.20¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.10
Less ton lots	23.10

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.75

Graphidox No. 4

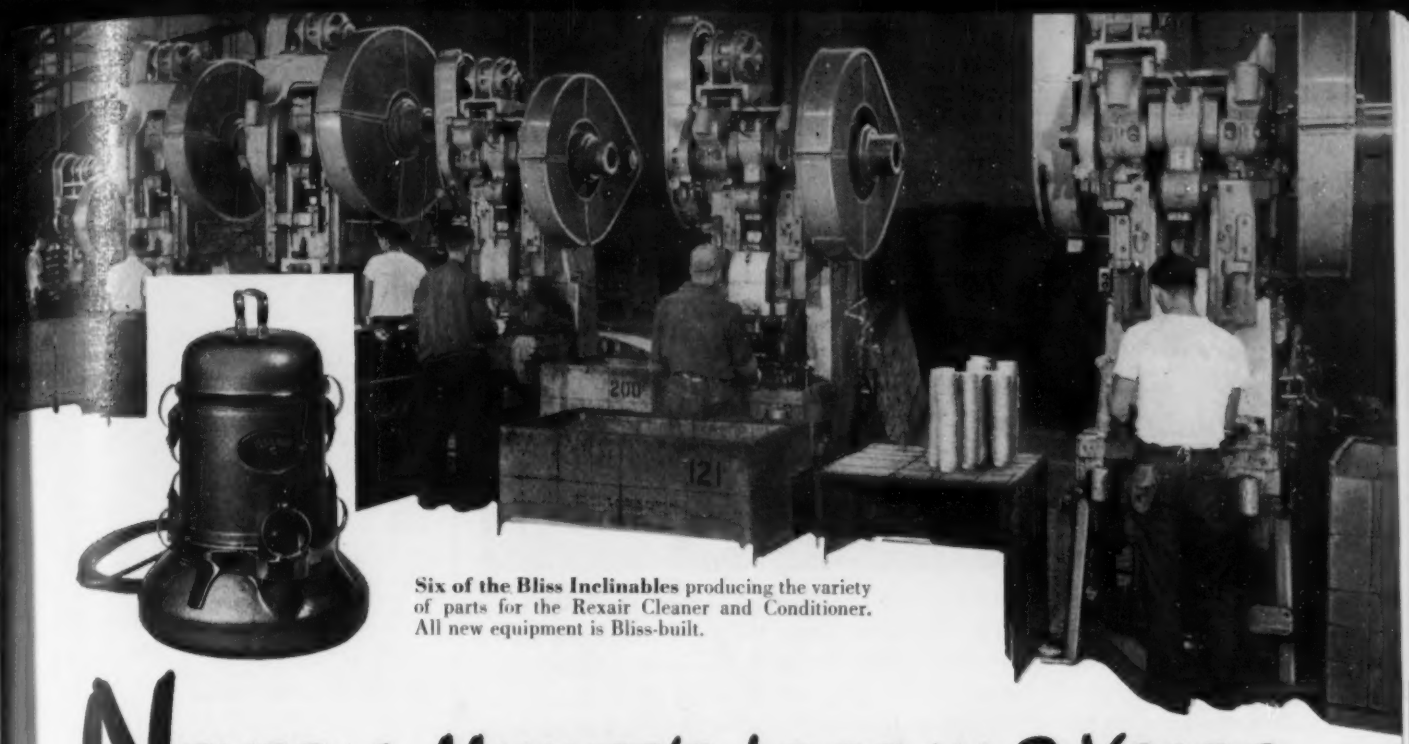
Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00
Ton lots to carload packed	19.00
Less ton lots	20.50

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

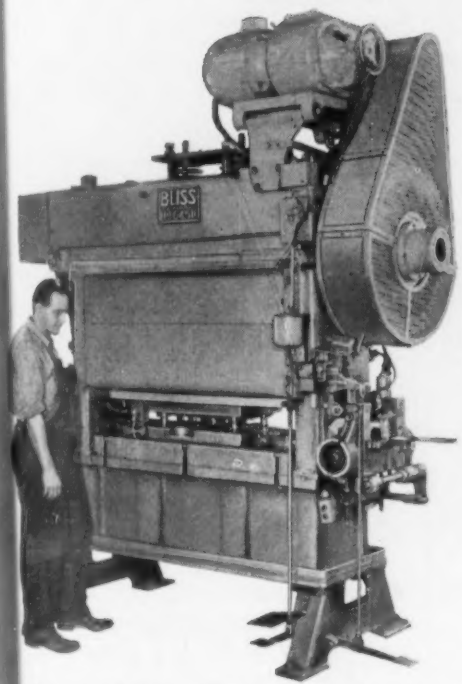
Ton lots	17.25
Less ton lots	18.50



Six of the Bliss Inclinables producing the variety of parts for the Rexair Cleaner and Conditioner. All new equipment is Bliss-built.

NEVER A MINUTE'S LOSS IN 2 YEARS

Stamping Rexair Cleaners and Conditioners



All the motor laminations used by Rexair are produced on this #615-D Bliss High Production Press.

Ten Bliss Inclinable presses and a Bliss High Production press equipped the Rexair Division of Martin-Parry Corporation to meet all stamping requirements on a high-volume, low-cost manufacturing basis. Die cushions were built into several presses to accommodate necessary drawing operations and to give Rexair greater versatility in its press room.

"Since the Bliss presses started operating about two years ago, we've never had a minute's production loss," says Les Johnson, Rexair's plant superintendent. The High Production press delivers an average of 8,600 perfect laminations per hour, running well within its capacity.

Bliss-Marquette Die Cushions are credited by Don Crane, press department foreman, for part of the long die life on the Inclinables producing separators, water pan bottoms and inspection plates. The pneumatic cushions exert a constant pressure throughout the entire stroke, and are used for drawing work that would not be possible with spring cushions, while at the same time eliminating the excessive pressures which cause wear and tear on dies.

Whatever your stamping problems, Bliss engineers can render valuable service in recommending equipment precisely suited to a given set of production conditions.

E. W. BLISS COMPANY, CANTON, OHIO
Mechanical and Hydraulic Presses, Rolling Mills, Container Machinery

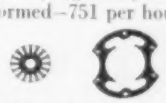
Inspection Plate—22-gauge steel, 6⅞" dia., 1⅝" drawn and formed—400 per hour.

Water Pan Bottom—.024 steel, 10½" dia., 1½" drawn and formed—356 per hour.

Separator—18-gauge aluminum, 4¼" dia., 1⅛" drawn and formed—514 per hour.

Fan Shroud (left)—24-gauge aluminum, 5½" dia., 1" drawn and formed—751 per hour.

Eddy Plate (right)—24-gauge aluminum, 5½" dia., 1" drawn and formed—751 per hour.



Motor Laminations—.018 steel, 2" dia., 3¾" dia., average 8,600 hourly production with progressive die.

"One or Several Copies Are Needed in Any Shop Doing Stamping Work"...*American Machinist*

Completely New

700 Pages • 450 Illustrations

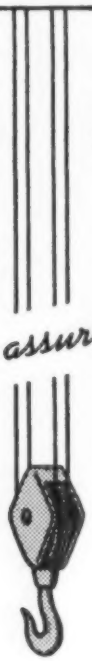
Sections on: Computing press jobs • Selecting proper press • Useful engineering tables • Die illustrations • Complete glossary. Plus a service section for Bliss presses. **$7.50**

E. W. BLISS COMPANY—Handbook Dept., Canton, Ohio

From a single press for a given job... to a complete press room... It's Bliss

Send your specifications for precision bolting to **ERIE**, headquarters for special bolting since 1913. This long experience with alloys, steels, latest heat treatment and most rigid machining and threading tolerances is at your service. It pays to entrust vital bolting to folks who do this kind of work day in and day out. Hundreds of heavy machinery manufacturers like to do business with **ERIE**. Try **ERIE** for *your* next special bolting requirement.

ERIE BOLT & NUT CO.
ERIE, PA.
A SUBSIDIARY OF Barium STEEL CORPORATION
Steelweight is our Value
STUDS • BOLTS • NUTS ~ ~ ALLOYS • STAINLESS • CARBON • BRONZE
REPRESENTATION IN PRINCIPAL CITIES



PRETESTED
PREFORMED
your assurance of longer wire rope life!

-Preformed-
"HERCULES"
RED-STRAND
WIRE ROPE
® REG U S PAT OFF

Every wire that goes into "HERCULES" (Red-Strand) Wire Rope is first thoroughly tested in our Engineering Laboratory. Uniformity and safety, toughness and efficiency are thereby pre-determined to assure you of longer wire rope life!

We Invite Your Inquiries

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A. LESCHEN & SONS ROPE CO. 5909 KENNERLY AVE. • ST. LOUIS, MO.
ESTABLISHED 1857
New York 6 · Chicago 7 · Birmingham 6 · Houston 3 · Denver 2 · Los Angeles 21 · San Francisco 7 · Portland 9 · Seattle 4

FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract ba
price, gross ton, lump size.
F.o.b. Niagara Falls, Alloy, W. Va.,
Welland, Ont., Ashtabula, O.
F.o.b. Johnstown, Pa.
F.o.b. Sheridan, Pa.
F.o.b. Etna, Clairton, Pa.
$2.00 for each 1% above 82% M
penalty, $2.15 for each 1% below 7
Briquets—Cents per pound of briqu
delivered, 66% contained Mn.
Carload, bulk 10.
Ton lots 12.

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% M 3% max.
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	74.00	75.00

Manganese Metal

Contract basis, 2 in. x down, cents p
pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% ma
Si, 2.5% max. Fe.
Carload, packed 34.
Ton lots 36.

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allow
east of Mississippi, cents per pound.
Carloads
Ton lots
Less ton lots

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contra
price, carloads, lump, bulk, delivered, p
lb. of contained Mn 19.

Calcium Metal

Eastern zone contract prices, cents p
pound of metal, delivered.

	Cast	Turnings	Distill
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Silicomanganese

Contract basis, lump size, cents p
pound of metal, delivered, 65-68% Mn
18-20% Si, 1.5% max. C. For 2% max. C
deduct 0.2¢.
Carload bulk 9.
Ton lots 11.
Briquet, contract basis carlots, bulk
delivered, per lb of briquet 11.
Ton lots 12.

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk
Iowa, or Wenatchee, Wash., $92.50 gro
ton, freight allowed to normal trade are
Si 15.01 to 15.50 pct, f.o.b. Niagara Fall
N. Y., $83.00. Add $1.00 per ton for ea
additional 0.50% Si up to and including
18%. Add $1.00 for each 0.50% Mn ov
1%.

Silicon Metal

Contract price, cents per pound co
tained Si, lump size, delivered, for ton lo
packed.
96% Si, 2% Fe 21.
97% Si, 1% Fe 22.

Silicon Briquets

Contract price, cents per pound
briquet bulk, delivered, 40% Si, 2 lb S
briquets.
Carload, bulk 6.
Ton lots 8.

Electric Ferrosilicon

Contract price, cents per pound co
tained Si, lump, bulk, carloads, delivere

25% Si	20.00	75% Si	14.
50% Si	12.40	85% Si	15.
90-95% Si			17.

Low-Carbon Ferromanganese

Contract price, cents per pound Mn co
tained, lump size, del'd, Mn 85-90%.

	Carloads	Ton	Les
0.7% max. C, 0.06% P, 90% Mn	26.25	28.10	29.
0.07% max. C	25.75	27.60	28.
0.15% max. C	25.25	27.10	28.
0.30% max. C	24.75	26.60	27.
0.50% max. C	24.25	26.10	27.
0.75% max. C, 7.00% max. Si	21.25	23.10	24.

For other ferroalloys see May 24 issue, p. 18

13 out of 15 Locomotive Builders

In the locomotive building industry Murex electrodes are normally used for production welding by 13 out of 15 foremost producers.*

Murex electrodes are preferred in locomotive building, first, because they make possible high speed welding essential to maximum production — second, because they can be depended on for consistent, day-in-day-out results in meeting exacting specifications for weld soundness and physical properties.

*Those with AAAA financial ratings.

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METAL & THERMIT CORPORATION

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Electrodes • Arc Welders • Accessories

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ANY SIZE • ANY METAL • ANY QUANTITY

12,000 Sets of Tools are at your disposal. More than a quarter-century of experience in designing and making Special Washers.

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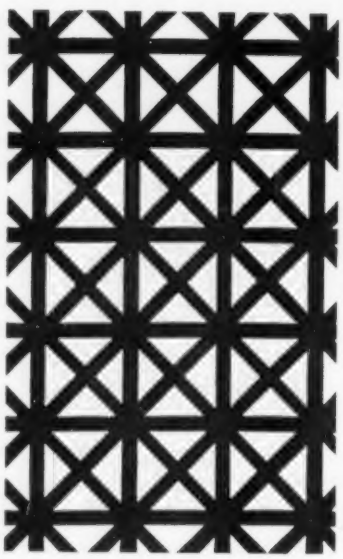
TRADE MARK



This is a lightweight type of grille especially suited for radiator enclosures, stove panels, kitchen cabinets, clothes and broom closets, lockers, and similar applications. It is made of a special bright finish, cold rolled steel, suitable for painting or plating, and is available in a wide range of stock size sheets and gauges.

Hendrick Ornamental can be furnished in a variety of attractive designs, the one illustrated being "Smalcane." Write for full information.

1876—Seventy-Fifth Anniversary—1951

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Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

Other Ferroalloys

Alsifer, 20%, Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carload ..... 9.90¢
Ton lots ..... 11.30¢

Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.15

Ferrocolumbium, 50-60%, 2 in. x D, contract basis, delivered, per pound contained Cb.
Ton lots $4.90
Less ton lots 4.95

Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload 75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa. freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.65

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $5.00

Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.
Openhearth ..... $3.00-$3.10
Crucible 3.10- 3.20
High speed steel (Primos) 3.20- 3.25

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium pentoxide, 86 to 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.25

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 7.00¢

Boron Agents

Contract prices per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B $5.25

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound ..... 50¢

Carbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound ..... 10.00¢

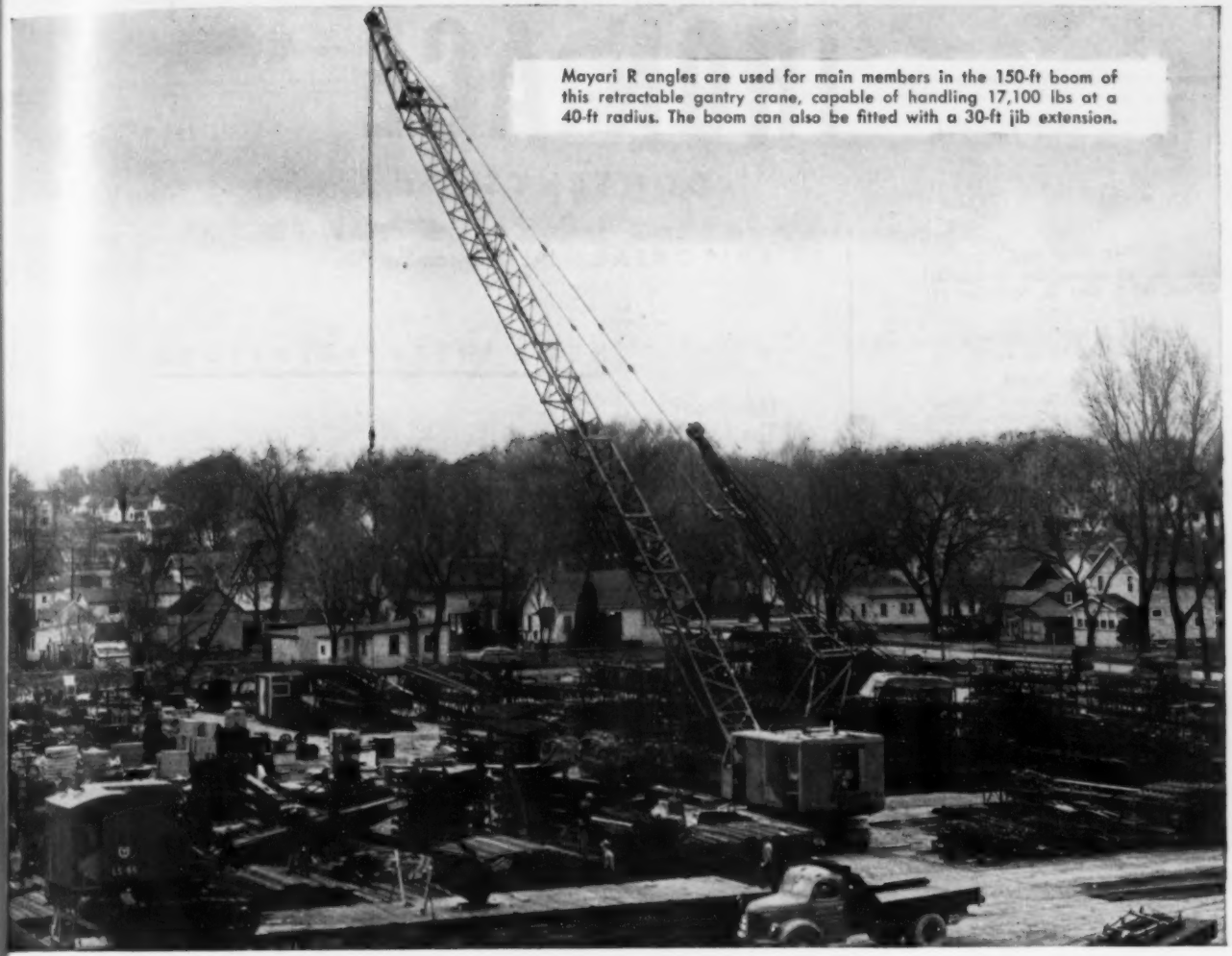
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots $1.20
F.o.b. Wash., Pa.; 100 lb up
10 to 14% B ..... .85
14 to 19% B 1.20
19% min. B 1.50

Grainal, f.o.b Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 65¢
No. 79 ..... 50¢

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots $1.40
Less ton lots 1.55

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
Less ton lots $1.80

Silcaz, contract basis, delivered.
Ton lots ..... 45.00¢



Mayari R angles are used for main members in the 150-ft boom of this retractable gantry crane, capable of handling 17,100 lbs at a 40-ft radius. The boom can also be fitted with a 30-ft jib extension.

Boom made of MAYARI R 30 ft longer and 2000 lbs lighter

Problem: In redesigning the boom on their model K-580 retractable gantry crane, the Link-Belt Speeder Corporation had two objectives in mind: (1) The boom had to be increased from 120 ft to 150 ft in length. (2) The deadweight of the new boom had to be reduced by 2000 lbs, in spite of its greater length.

Solution: After they studied the mechanical properties of various grades of steel the engineers concluded that Bethlehem's Mayari R would do the job at low cost. The main longitudinal members were made of Mayari R angles of thinner gage than ordinarily used with structural-grade carbon steel. This reduced the deadweight and at the same time provided the extra strength needed for the longer structure. Because of the reduction in weight made possible with Mayari R, the crane has a lifting capacity 1000 lbs greater than with the previous booms.

If you are building construction equipment of any type, it will pay you to look into the advantages of low-alloy, high-strength Mayari R. It goes farther than ordinary steel, and it allows worthwhile improvements in design. Write for a copy of Mayari R catalog 259.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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Mayari R *makes it lighter... stronger... longer lasting*